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(54) **DOVETAIL JIG**

(75) Inventors: **David R. Hout**, Clinton, OH (US); **W. Jason Bare**, Uniontown, OH (US)

Correspondence Address:
SAND & SEBOLT
AEGIS TOWER, SUITE 1100
4940 MUNSON STREET, NW
CANTON, OH 44718-3615 (US)

(73) Assignee: **HART DESIGN, INC.**, Hartville, OH

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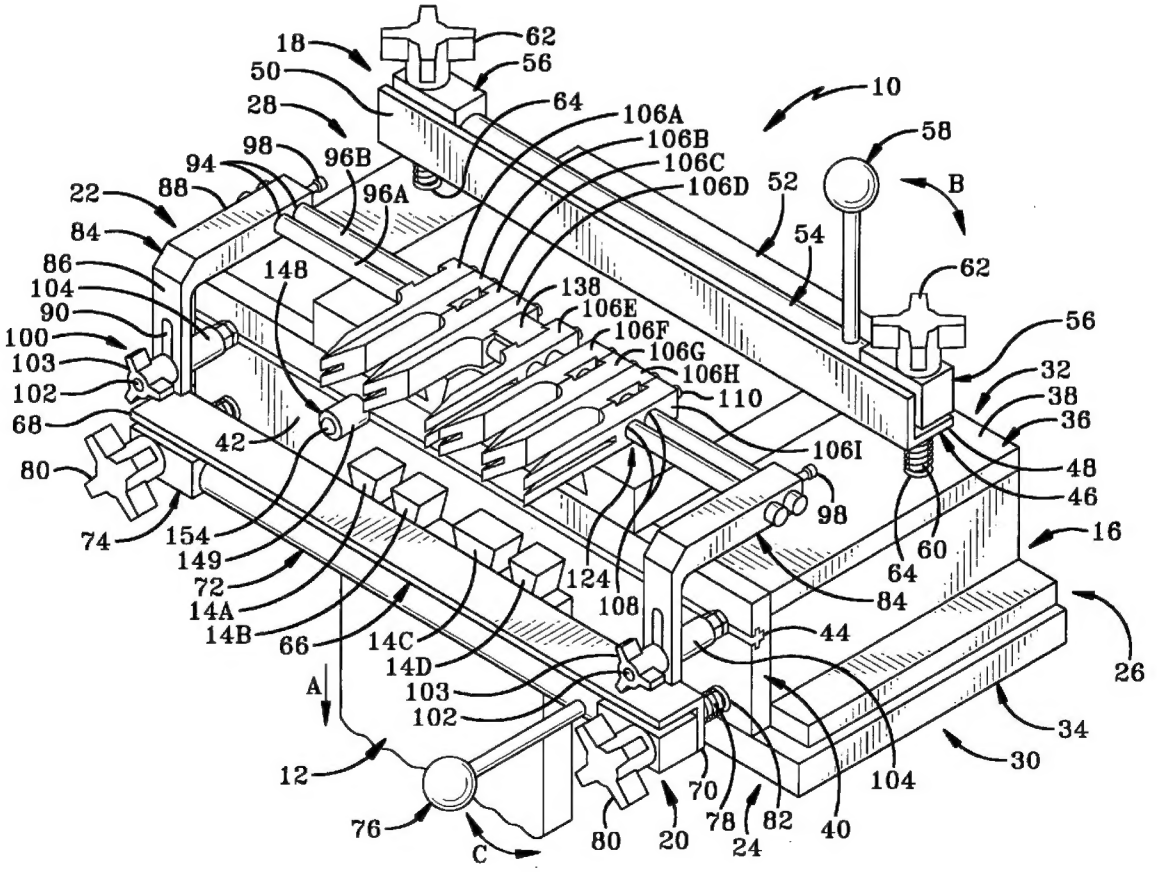
(57) **ABSTRACT**

A dovetail jig has a frame with a plurality of longitudinally and axially positionable guide fingers mounted thereon each having straight and tapered guide surfaces used in forming dovetails and pins in respective workpieces. Spacers interlockingly fit in slots formed in the guide fingers to set spacing between adjacent guide fingers. A stop includes a first stop member having a first positioning surface positionable at a first location for positioning a first workpiece and a second stop member having a second positioning surface positionable at a second location for positioning a second workpiece. Preferably, the second stop member defines a hole in which the first stop member is received to mount the second stop member on the first stop member. A workpiece-securing mechanism includes a camming bar and an L-shaped clamp member which serves as a cover to prevent workpiece shavings from clogging the camming engagement between the two.



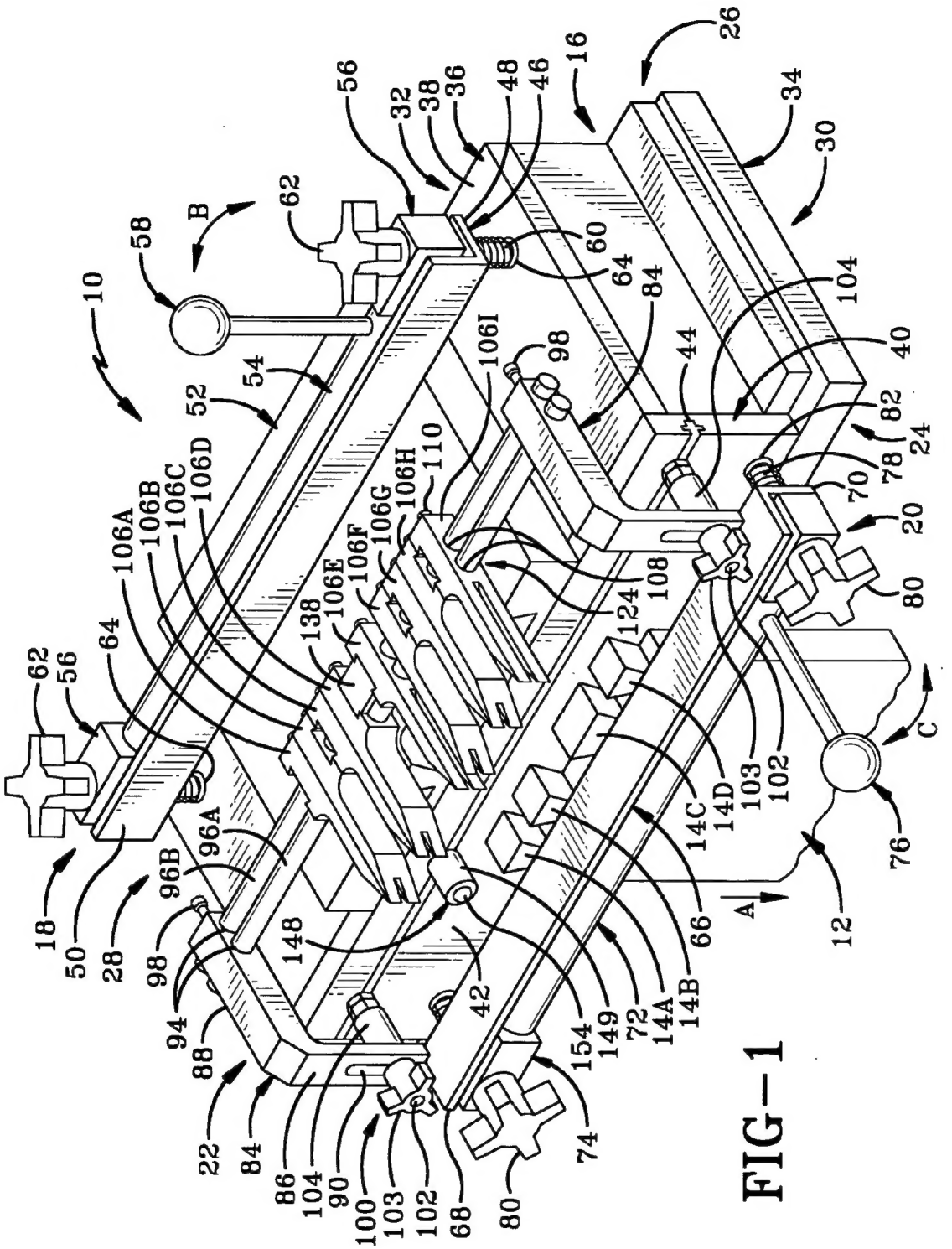

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FIG-1

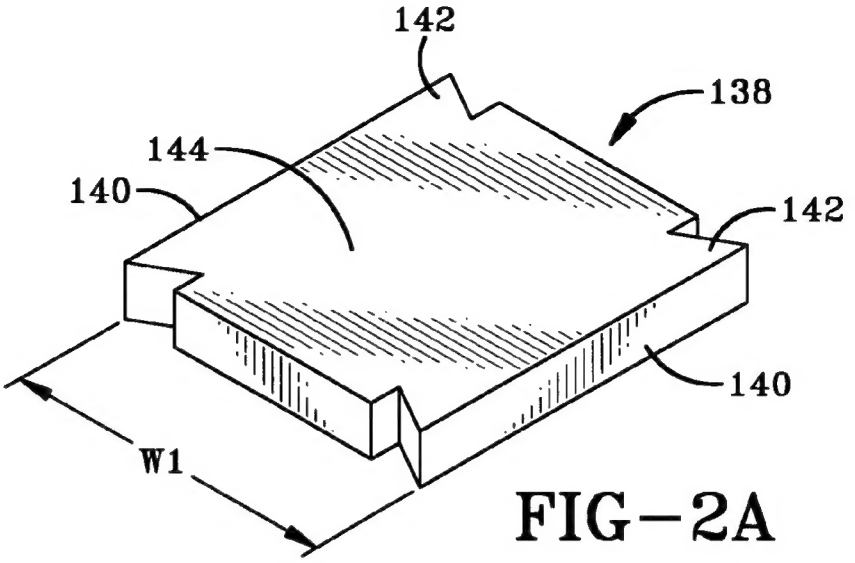
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FIG-2A

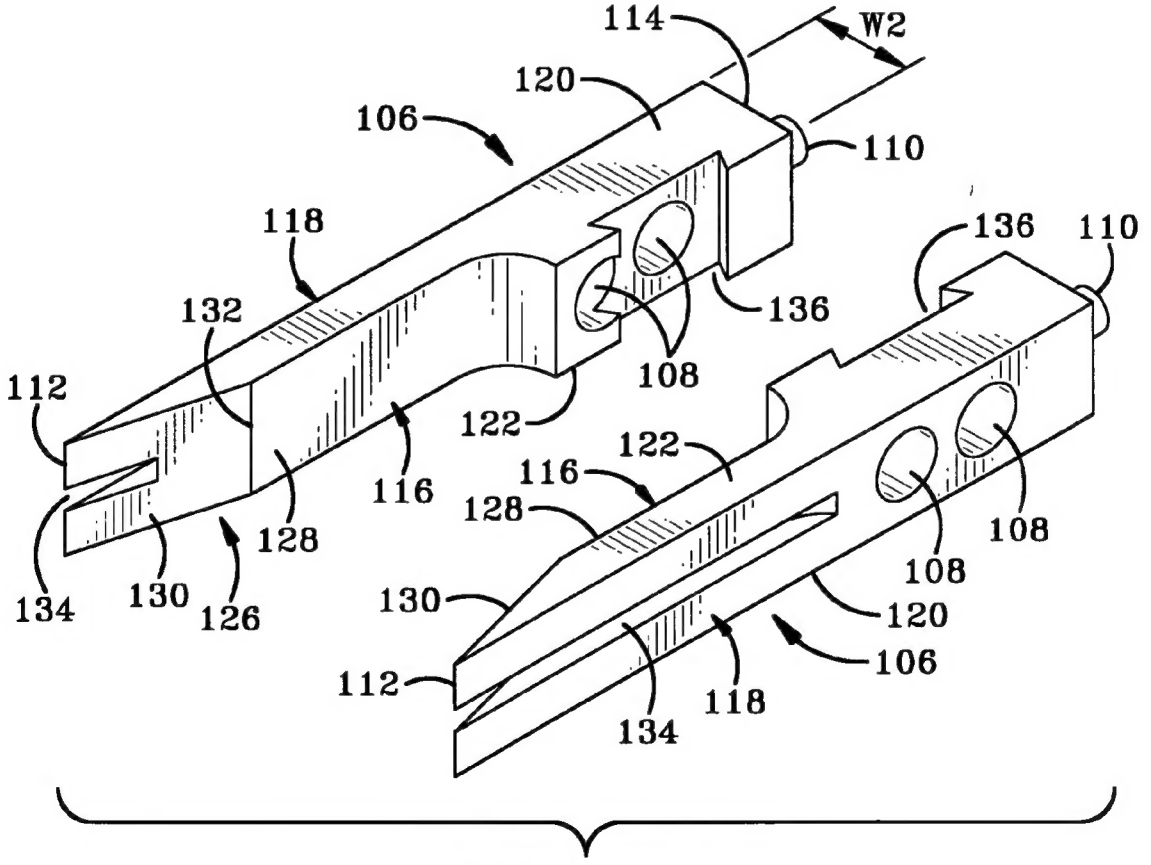
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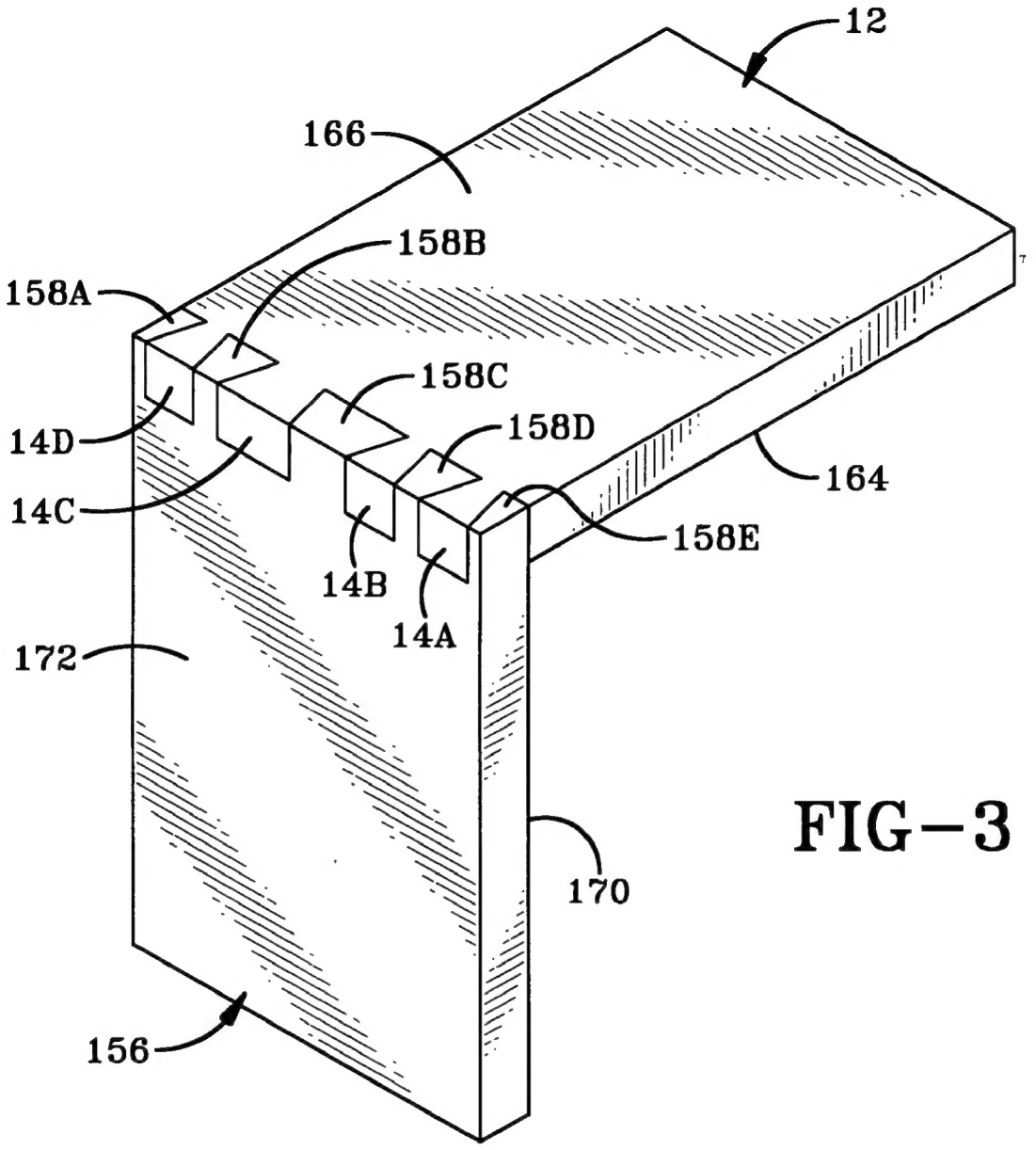
FIG-2B



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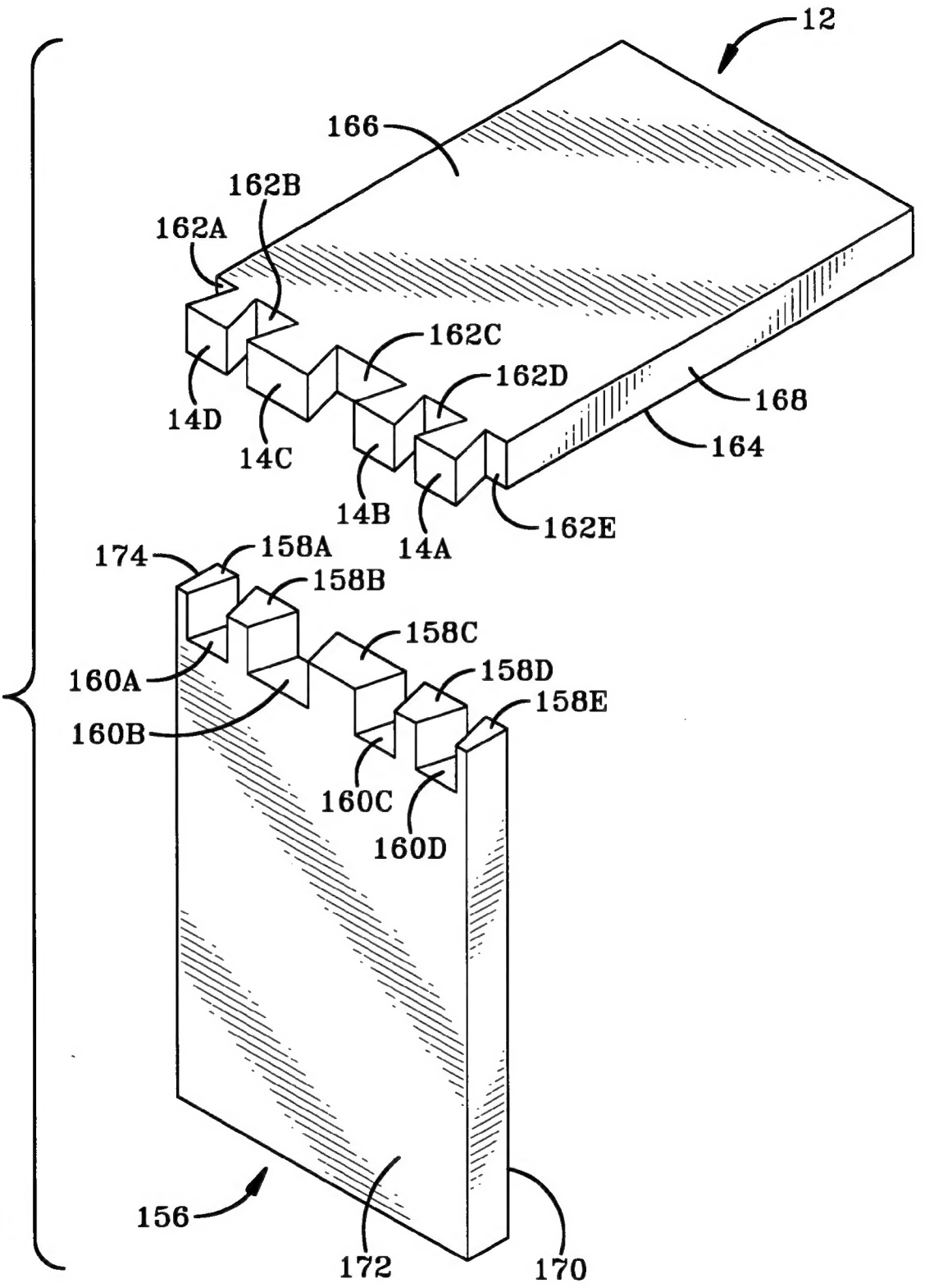
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166
162B
162A
162C
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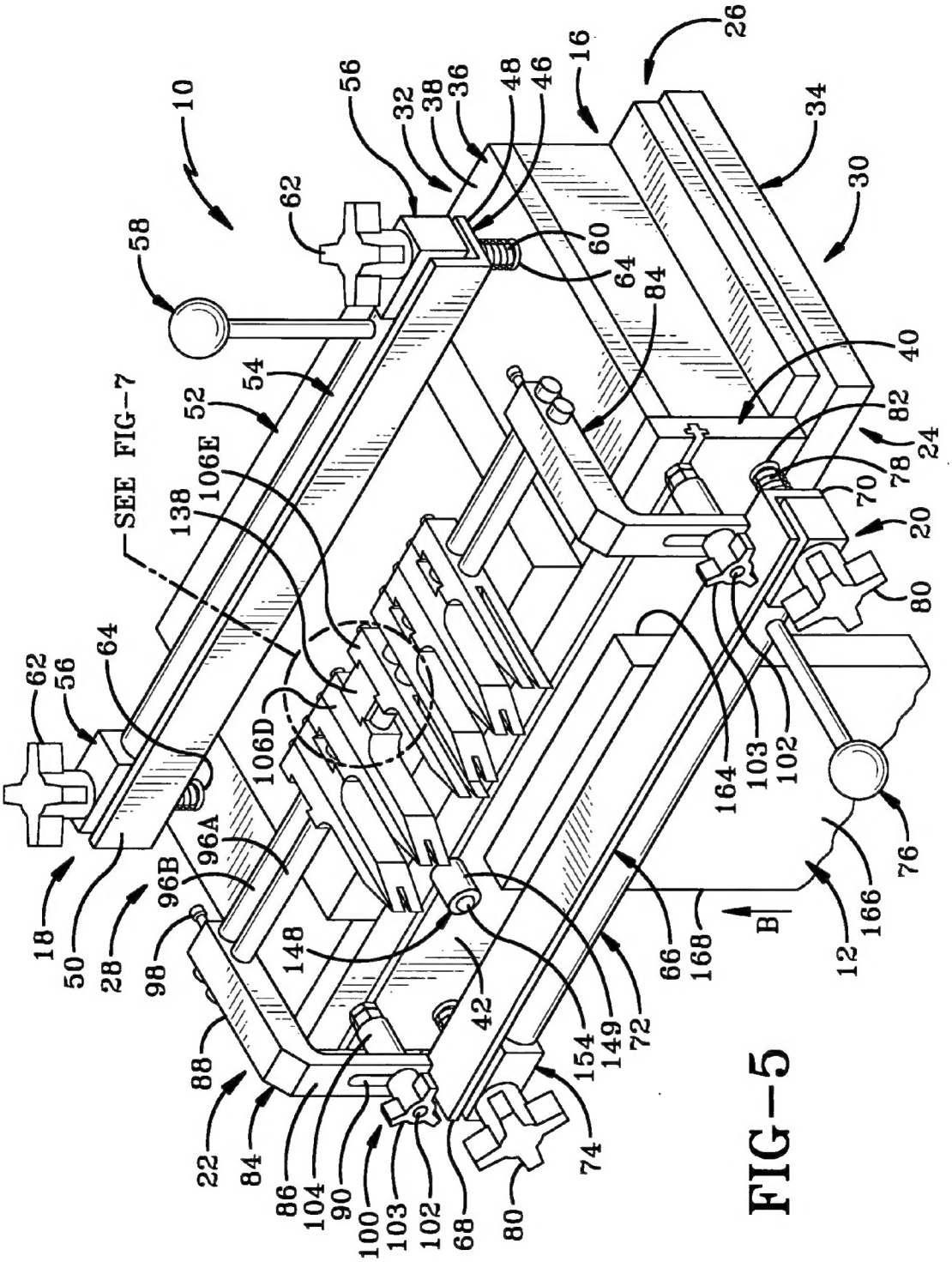
FIG-4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SEE FIG-7

FIG-5

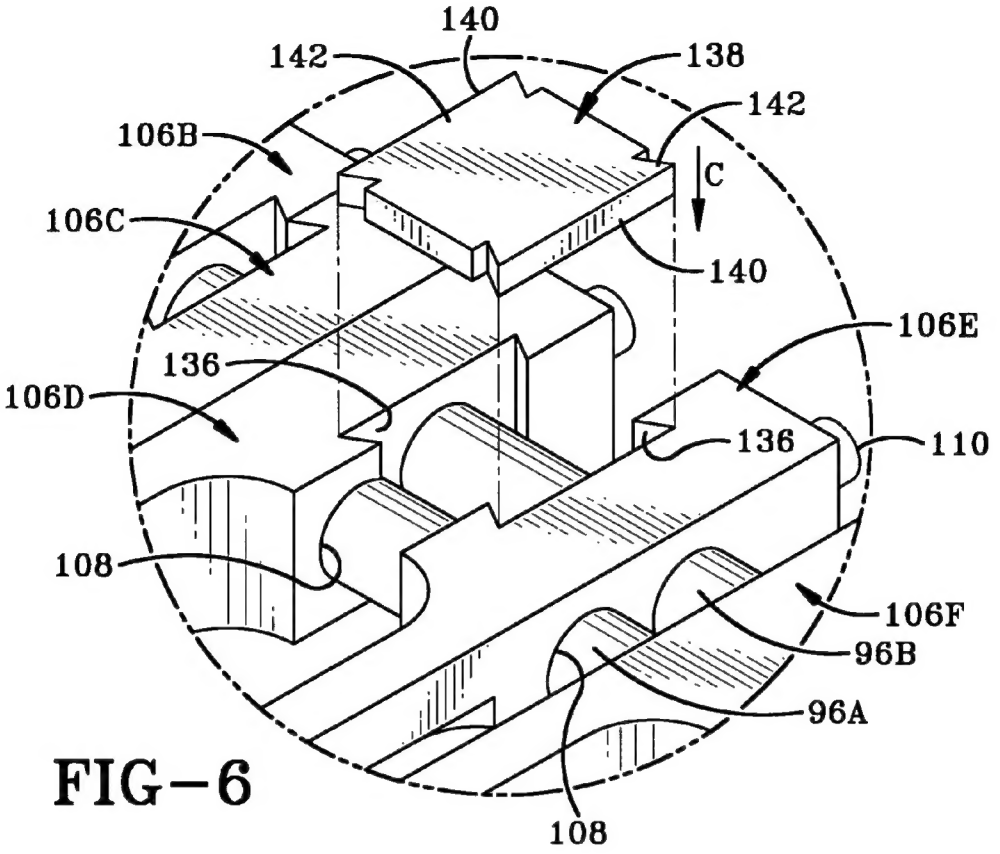
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FIG-6

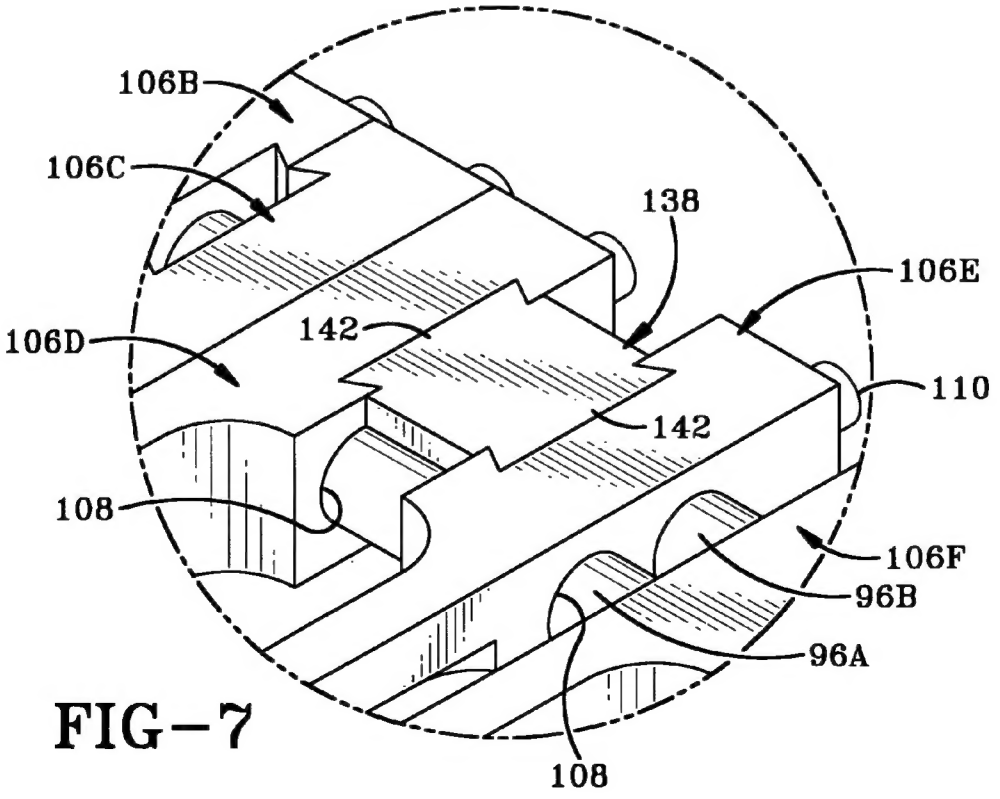
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FIG-7

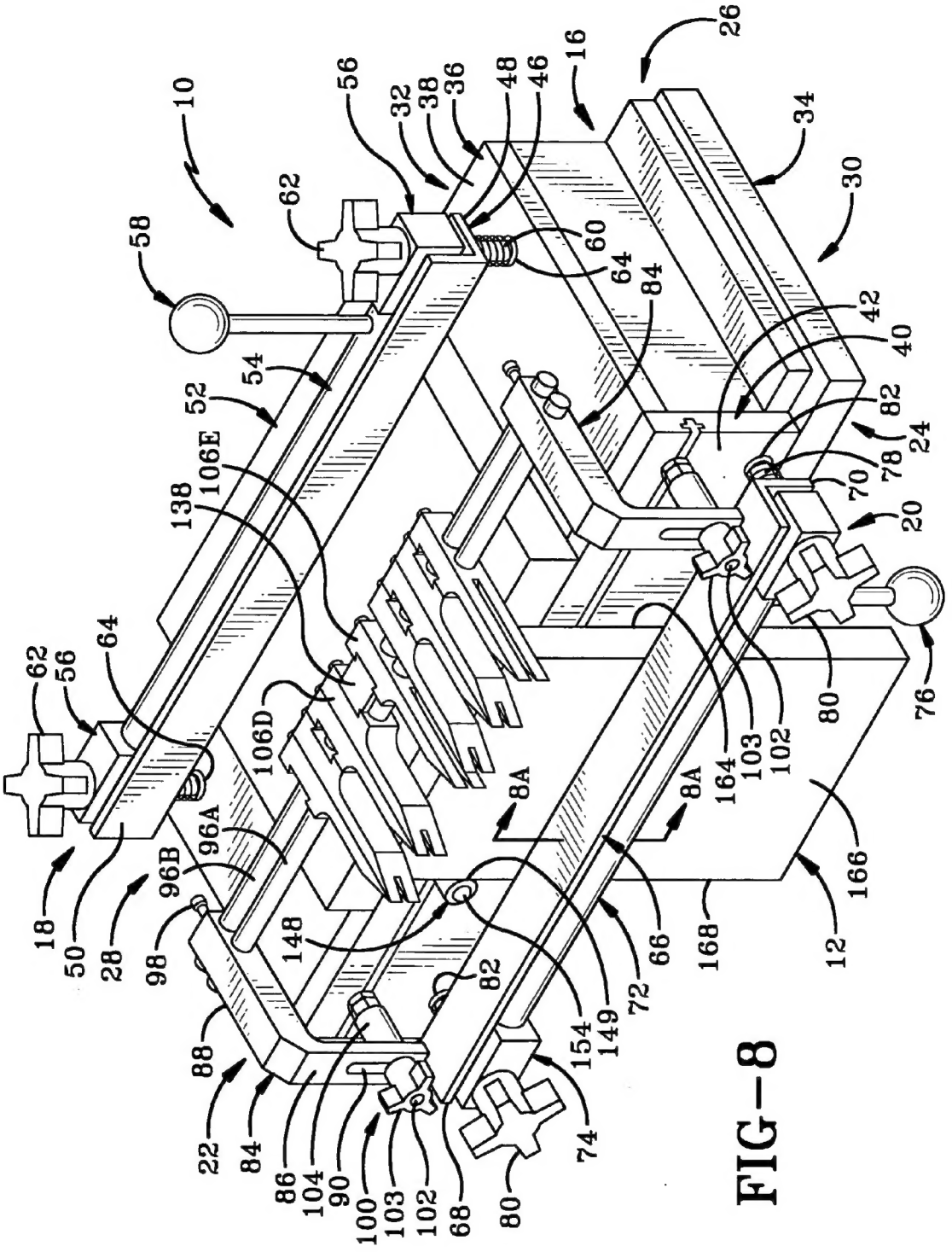
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FIG-8

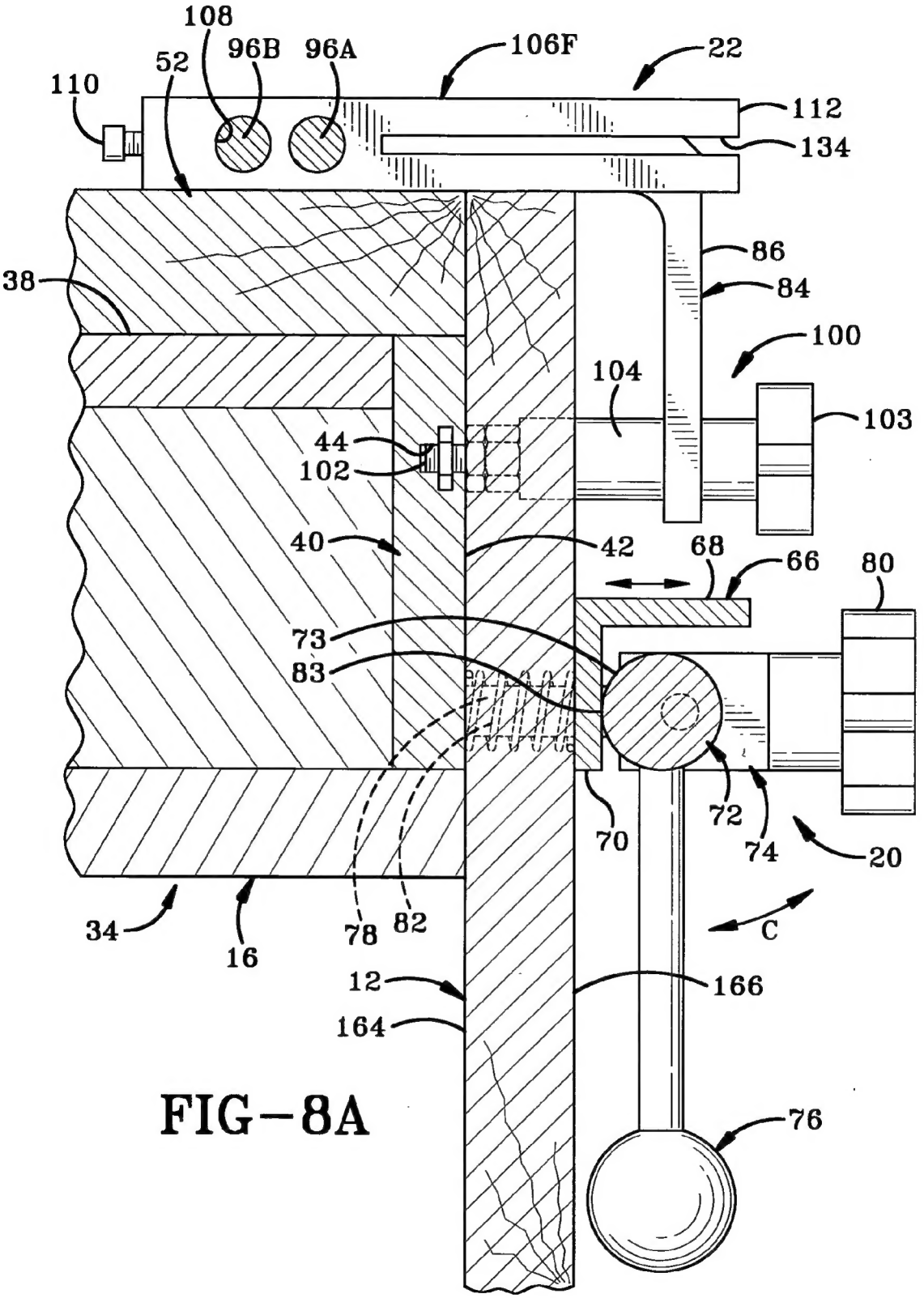
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FIG-8A

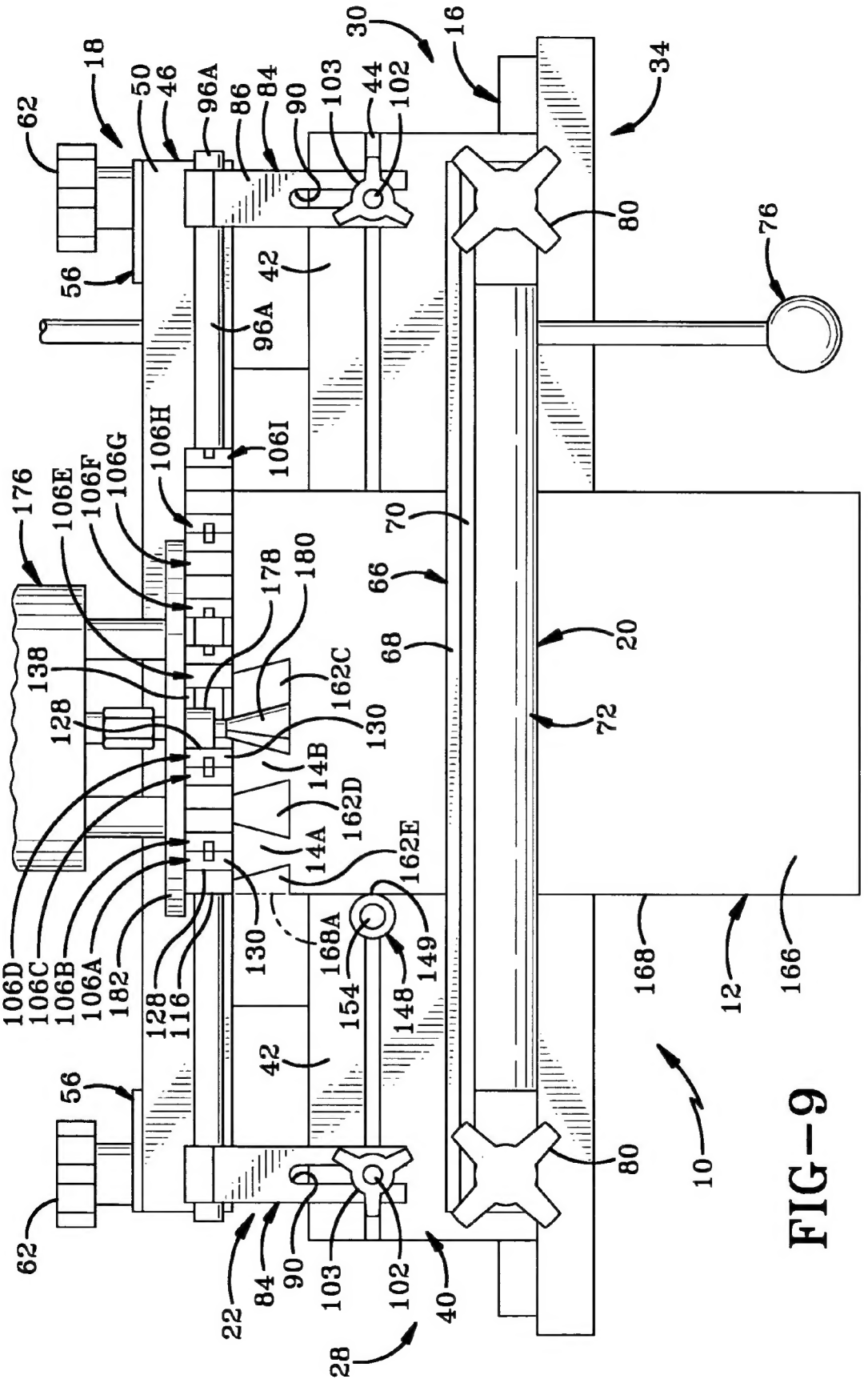
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FIG-9

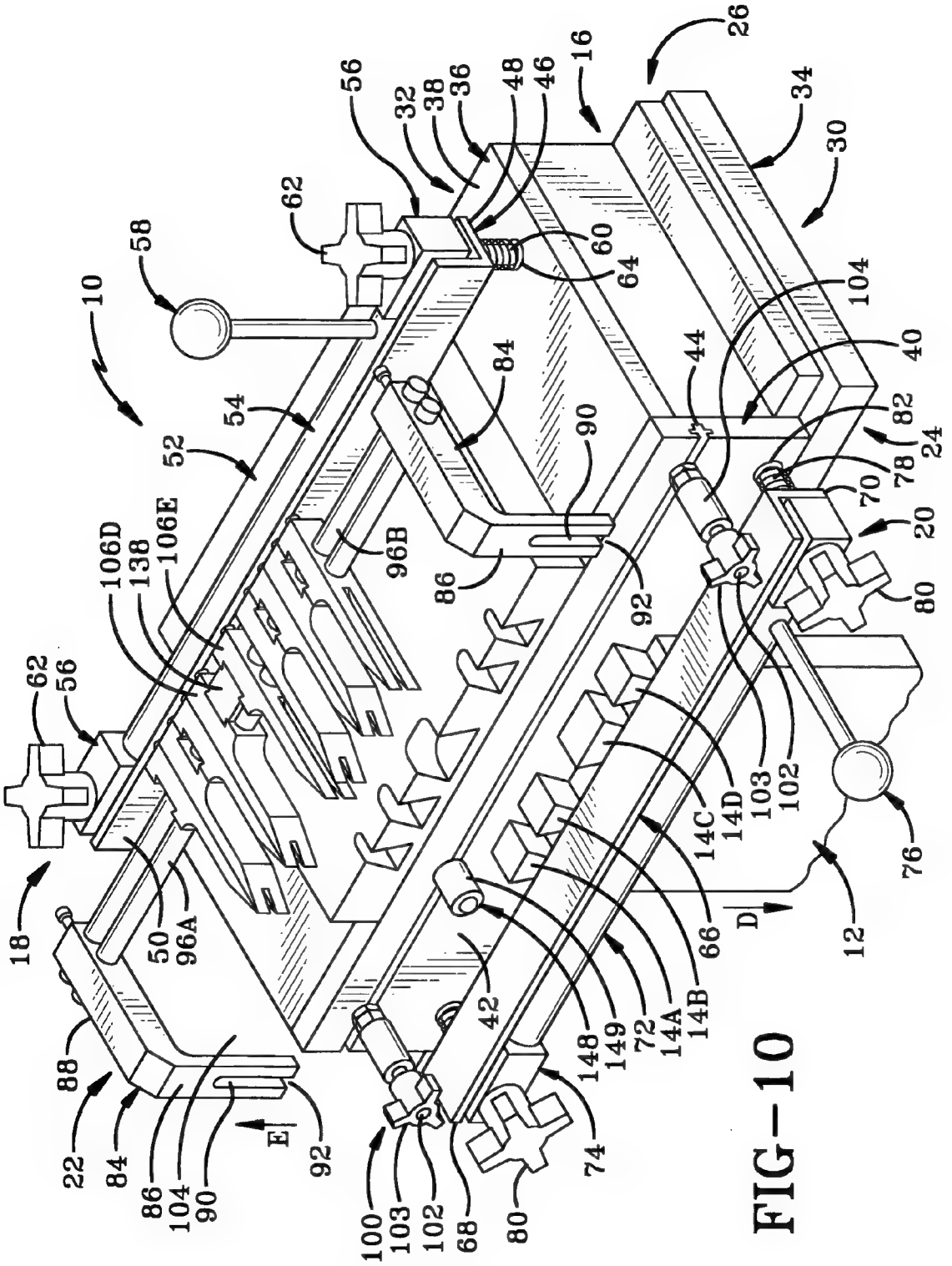
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FIG-10

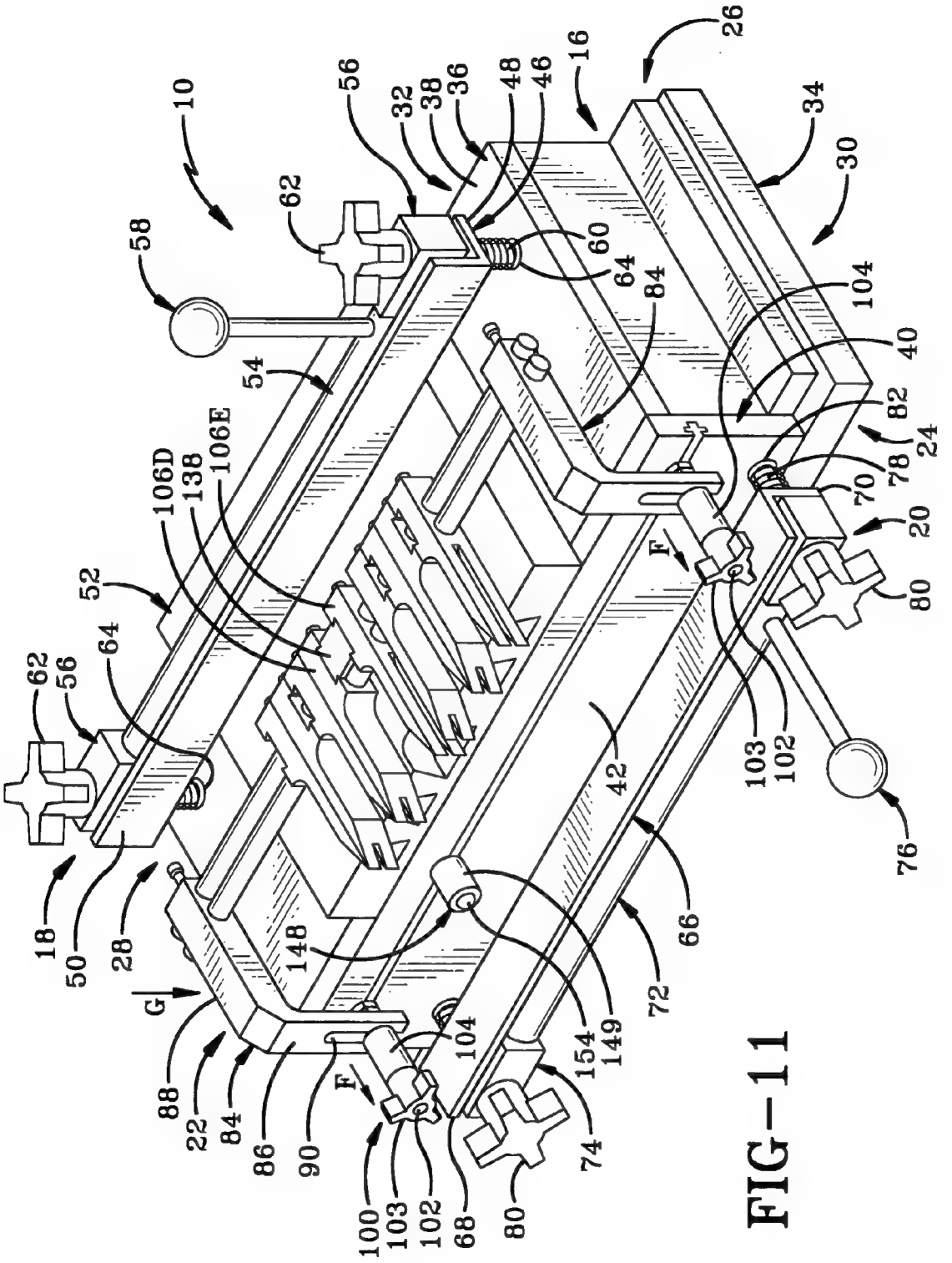
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FIG-11

FIG-12

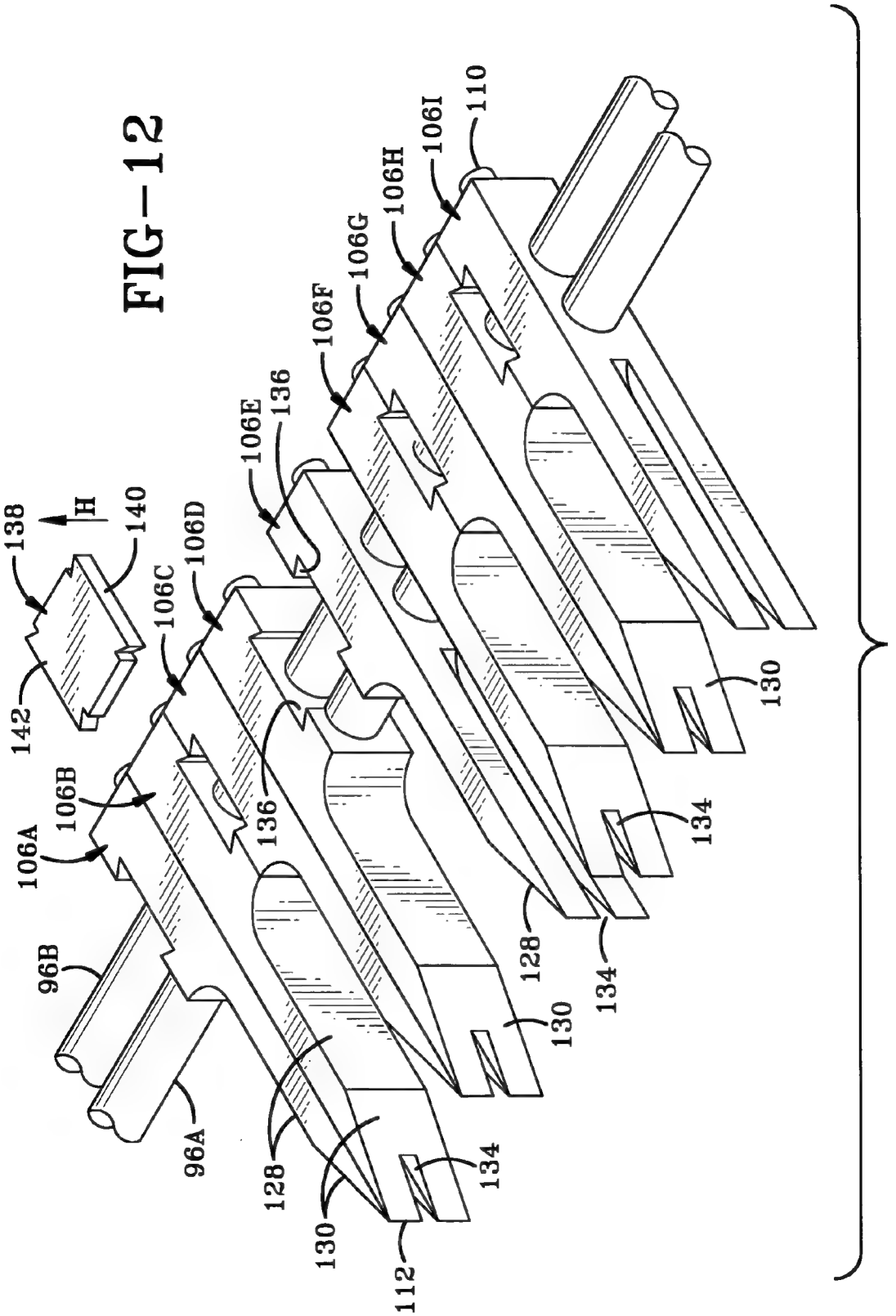
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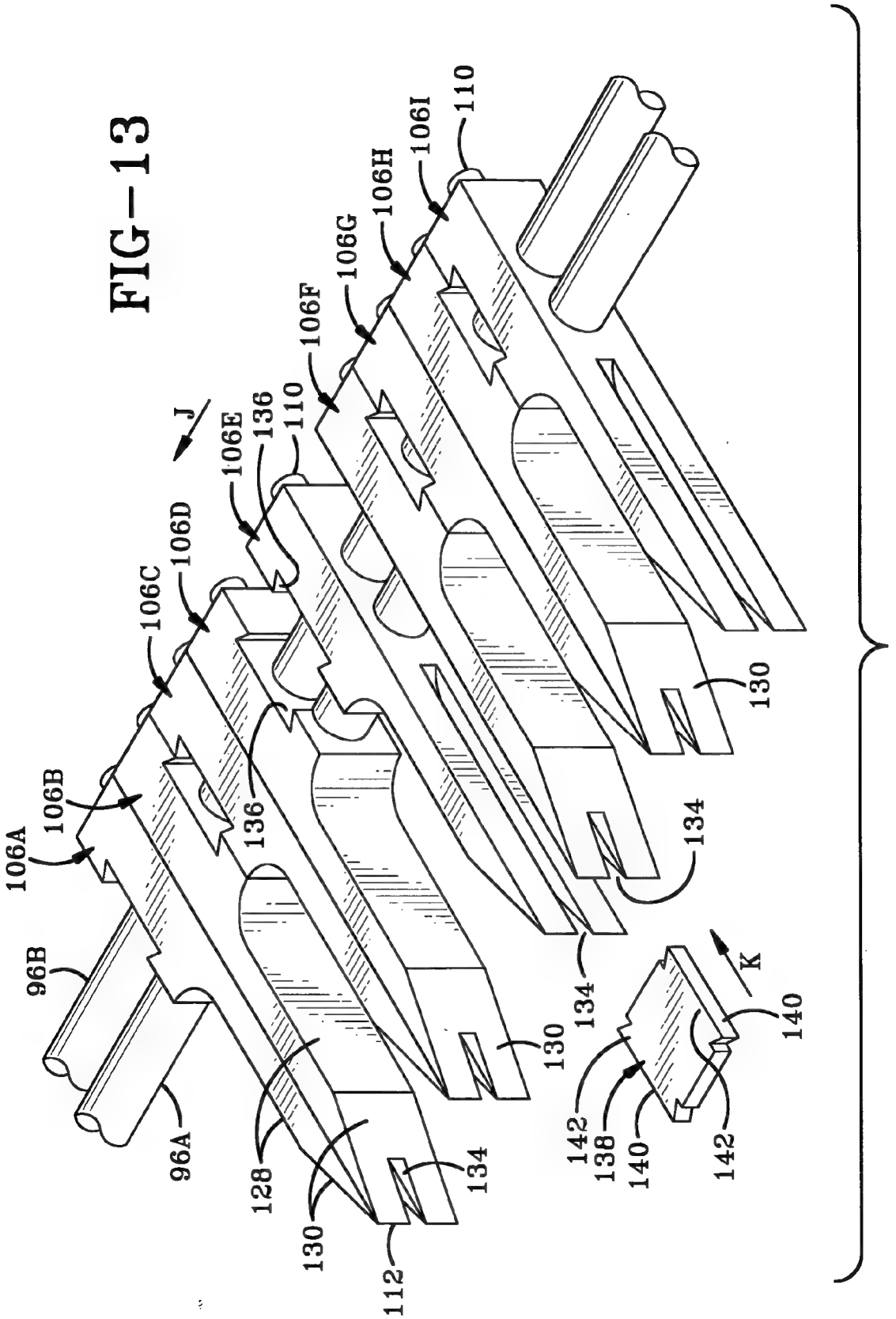
FIG-13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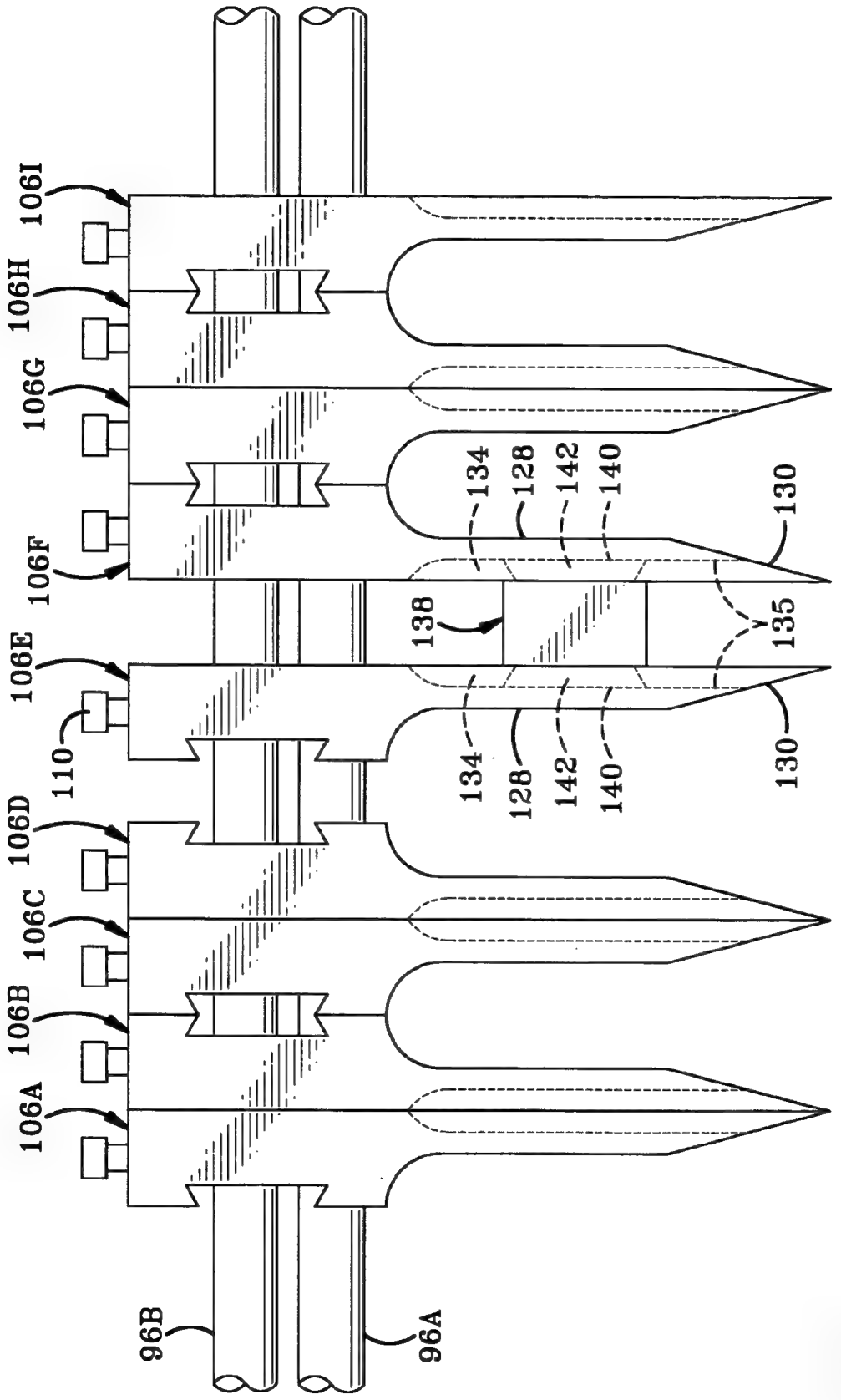
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FIG-14

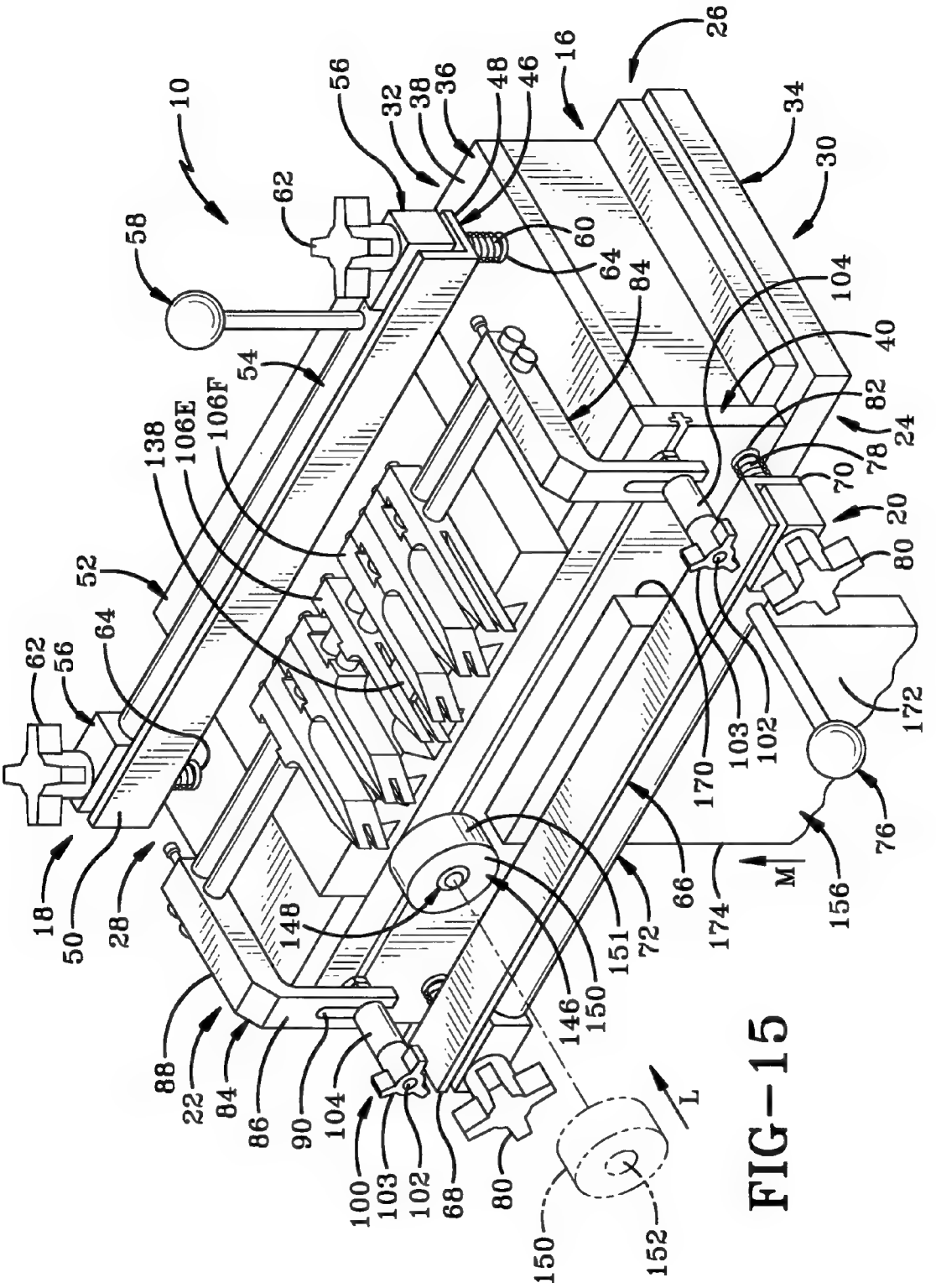
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FIG-15

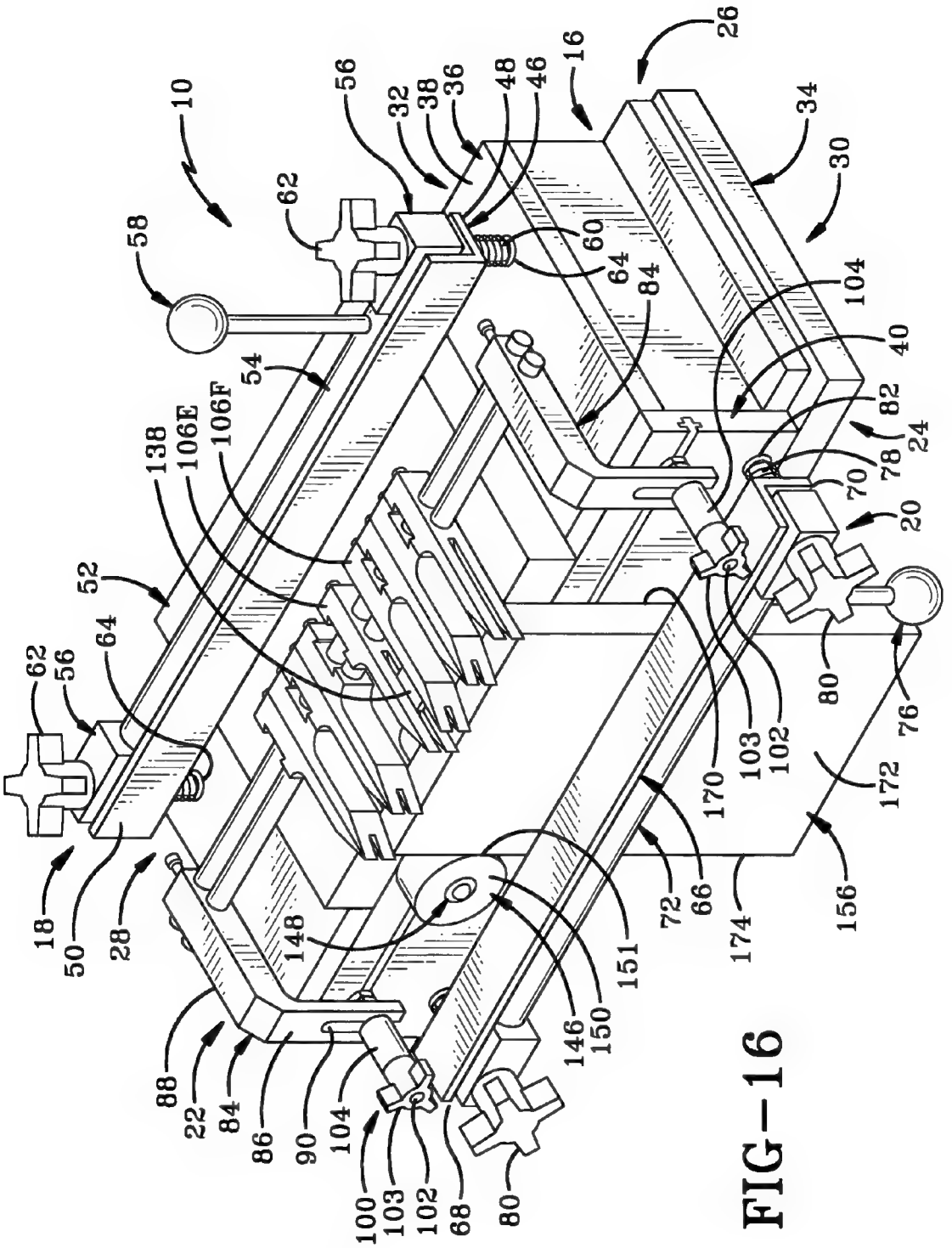
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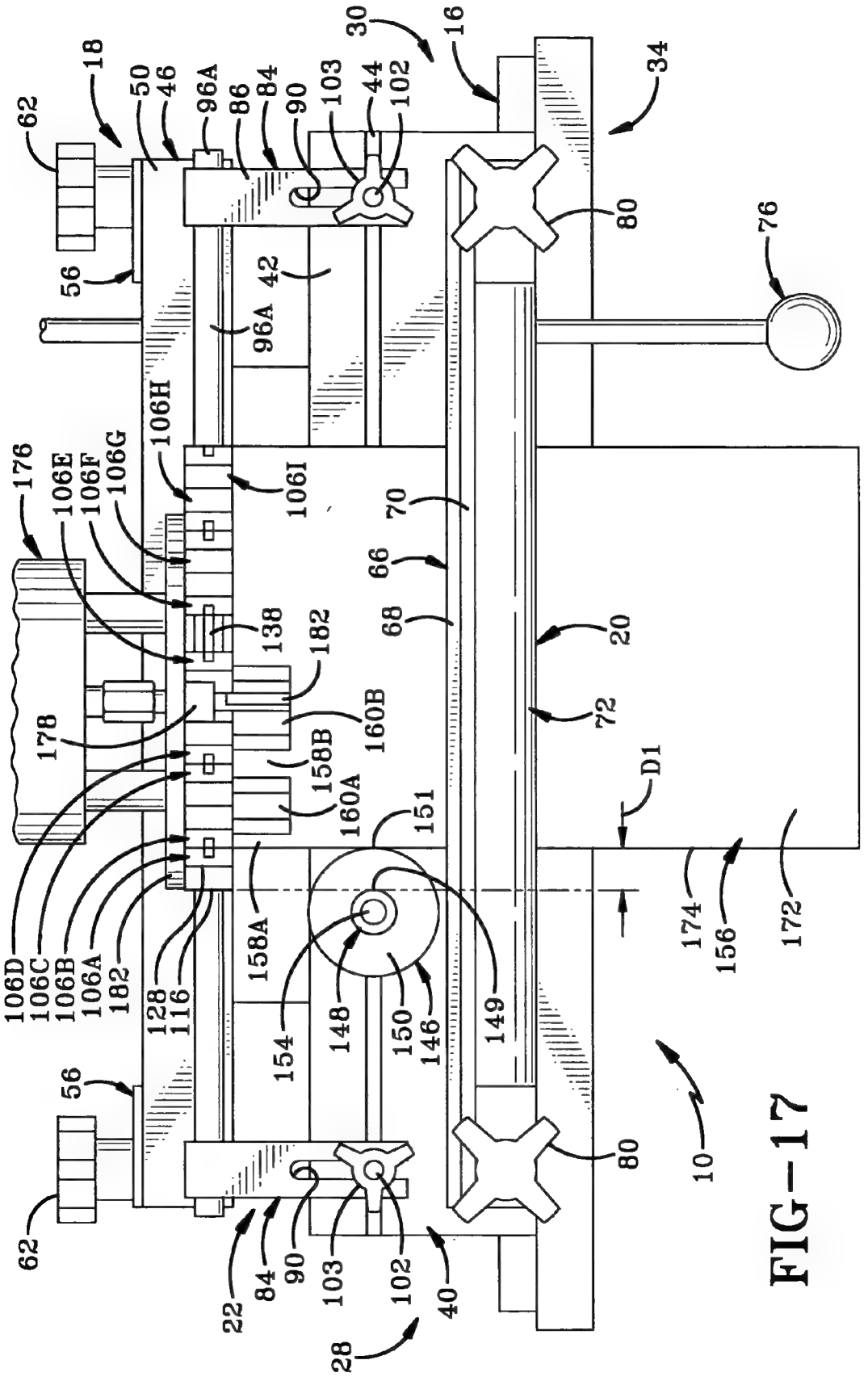
FIG-16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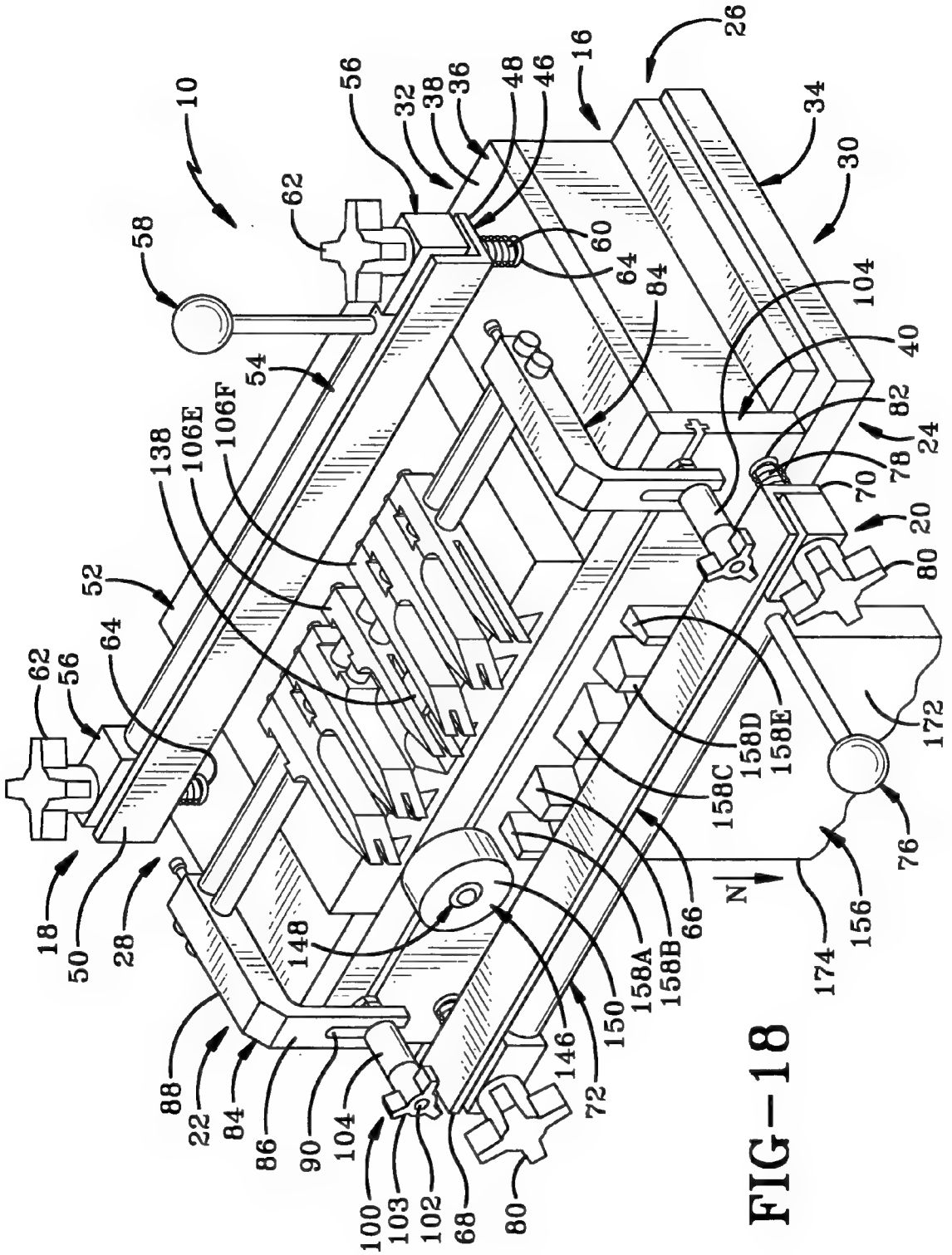
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FIG-18

DOVETAIL JIG

BACKGROUND OF THE INVENTION

[0001] 1. Technical Field

[0002] The invention relates generally to a jig for cutting workpieces such as boards to form joints such as a dovetail joint between a pair of workpieces. More particularly, the invention relates to such a jig having a plurality of guide fingers for guiding a cutting apparatus during the cutting of the workpieces wherein the spacing between the guide fingers is adjustable. Specifically, the invention relates to such a jig wherein unique spacers are used to set the distance between adjacent guide fingers.

[0003] 2. Background Information

[0004] Dovetail jigs and similar jigs for cutting joint members are well known and include those which use a solid template having fixed guide fingers, as well as those having a plurality of longitudinally moveable guide fingers which allow infinite adjustment of spacing between the guide fingers, such as U.S. Pat. No. 4,428,408 to Grisley. As is well known in the art, templates formed of solid plates or a plurality of fingers include straight guide surfaces extending outwardly in an axial direction for guiding a cutting apparatus such as a router to cut a first workpiece to form dovetails and tapered guide surfaces for guiding the router in cutting a second workpiece to form pins of a mating configuration with the dovetails. The templates which include a plurality of guide fingers provide the distinct advantage of adjusting the spacing between the fingers to vary the size of the pins or dovetails and the gaps therebetween as desired. However, there is room for improvement with regard to templates utilizing such adjustable guide fingers.

[0005] Setting the spacing between the various fingers of such templates requires measurements between the fingers to ensure the desired spacing and associated size of the dovetails and pins. Such measurements can be relatively painstaking and time consuming. While spacers are known in the art (see Grisley), there remains room for improvement in order to quickly and surely secure the spacing between an adjacent pair of such guide fingers.

[0006] In addition, stops mounted on the frame of a jig are used in the positioning of the workpiece thereon. When the guide fingers extend in a single direction with the straight and tapered guide surfaces thereon for the formation of dovetails and pins on respective workpieces, it is necessary to adjust the position of the respective workpieces so that the dovetails and pins are properly aligned on each workpiece. While adjustable stops are known in the art, there is still room for improvement in this area to facilitate the positioning of the respective workpieces on the jig.

[0007] Moreover, the securing or clamping mechanisms for securing a workpiece to the jig while being cut sometimes use a camming bar in order to quickly lock the workpiece into place. However, shavings from the cutting process tend to collect between the camming member and a clamp bar and thus interfere with the proper camming engagement between these two members.

[0008] The present invention solves these problems with a variety of unique features which facilitate the formation of joint members such as dovetails and pins.

BRIEF SUMMARY OF THE INVENTION

[0009] The present invention provides a jig used for cutting joint members in workpieces, comprising a frame having axial and longitudinal directions and adapted to selectively secure the workpieces to be cut; a plurality of guide fingers elongated in the axial direction; each guide finger having guide surfaces adapted to guide a cutter in the formation of the joint members; the guide fingers being selectively positionable in the longitudinal direction; and a spacer selectively mountable on a first pair of adjacent fingers to selectively fix the adjacent fingers in the longitudinal direction with respect to one another, thereby setting longitudinal spacing between the first and second fingers.

[0010] The present invention also provides a method comprising the steps of securing a first workpiece to a frame having axial and longitudinal directions; positioning a plurality of axially-elongated guide fingers in the longitudinal direction; fixing a first adjacent pair of the guide fingers in the longitudinal direction with respect to one another with a spacer, the first adjacent pair including first and second guide fingers; securing the plurality of guide fingers with respect to the frame; and guiding a cutter with the guide fingers to cut the first workpiece.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

[0011] **FIG. 1** is a perspective view of the dovetail jig of the present invention.

[0012] **FIG. 2A** is an enlarged perspective view of the spacer of the present invention.

[0013] **FIG. 2B** is an enlarged perspective view of a pair of the guide fingers of the present invention.

[0014] **FIG. 3** is a perspective view of a dovetail joint formed by a pair of workpieces.

[0015] **FIG. 4** is an exploded view of the dovetail joint of **FIG. 2** showing the workpieces separately.

[0016] **FIG. 5** is a perspective view similar to **FIG. 1** showing a first workpiece in the process of being positioned for the cutting of dovetails.

[0017] **FIG. 6** is an enlarged view similar to the encircled portion of **FIG. 5** showing the spacer in the process of being inserted into slots formed in an adjacent pair of the guide fingers.

[0018] **FIG. 7** is an enlarged view of the encircled portion of **FIG. 5** showing the spacer inserted in the slots.

[0019] **FIG. 8** is a perspective view similar to **FIG. 5** with the first workpiece positioned against the first stop member for the cutting of the dovetails with the lower securing mechanism in the locked position.

[0020] **FIG. 8A** is an enlarged fragmentary sectional view taken on line **8A-8A** of **FIG. 8** showing the camming engagement between the camming member and clamping member of the workpiece securing mechanism.

[0021] **FIG. 9** is an enlarged fragmentary front elevational view of the jig showing a router cutting gaps in the first workpiece to form the dovetails.

[0022] **FIG. 10** is a perspective view similar to **FIG. 8** showing the first workpiece being removed and the finger-mounting assembly being removed from the frame of the jig for repositioning.

[0023] **FIG. 11** is similar to **FIG. 10** and shows a pair of spacers being moved and the finger-mounting assembly being repositioned on the frame on the other side of the moved spacers.

[0024] **FIG. 12** is an enlarged fragmentary perspective view of the guide fingers mounted on the guide bars of the finger-mounting assembly with the spacer being removed from the slots of an adjacent pair of guide fingers.

[0025] **FIG. 13** is similar to **FIG. 12** and shows one of the fingers of the adjacent pair being moved along the guide bars and the spacer being inserted into a second pair of slots, one of which is on the moved guide finger and another of which is on a different guide finger in order to set the spacing between this second pair of adjacent guide fingers.

[0026] **FIG. 14** is a fragmentary top plan view of the guide fingers shown in **FIG. 13** showing the spacer positioned in the second pair of slots in preparation for cutting the second workpiece to form pins thereon.

[0027] **FIG. 15** is similar to **FIG. 11** and shows the new position of the spacer in the second pair of slots with the annular second stop member being positioned over the first stop member and the second workpiece being moved into position.

[0028] **FIG. 16** is similar to **FIG. 15** and shows the second workpiece secured in position against the second stop member for cutting of the second workpiece to form the pins thereon.

[0029] **FIG. 17** is a fragmentary front elevational view of the jig shown in **FIG. 16** showing the router cutting the gaps between the pins on the second workpiece.

[0030] **FIG. 18** is similar to **FIG. 16** and shows the second workpiece with pins cut therein being removed from the jig.

[0031] Similar numbers refer to similar parts throughout the specification.

DETAILED DESCRIPTION OF THE INVENTION

[0032] The dovetail jig of the present invention is indicated generally at **10** in **FIG. 1**. Jig **10** is used in the cutting of workpieces to form dovetail joints and shows a first workpiece **12** being removed from jig **10** as indicated by Arrow A in **FIG. 1** after workpiece **12** has been cut to form dovetails **14**A-D thereon. Most typically, first workpiece **12** or similar workpieces are wooden boards, but may be other suitable material such as plastics and so forth.

[0033] Jig **10** includes a frame **16**, an upper securing mechanism **18** mounted on frame **16**, a lower workpiece-securing mechanism **20** mounted on frame **16** and a finger-mounting assembly **22** mounted on frame **16**. Frame **16** has a front **24**, a rear **26** in opposed relation to front **24**, and a pair of opposed ends **28** and **30**. Frame **16** has an axial direction extending between front **24** and rear **26** and is elongated in a longitudinal direction extending between opposed ends **28** and **30**. Frame **16** also has a top **32** and a bottom **34** opposed thereto and adapted to sit atop a table or stand (not shown) to be mounted thereon. More particularly, jig **10** includes an upper wall **36** having a substantially flat upper surface **38** and a front wall **40** having a substantially flat front surface **42**. A T-slot **44** is formed in front wall **40** and is open to front surface **42** and extends in a longitudinal direction over the entire length of front wall **40**.

[0034] With continued referenced to **FIG. 1**, upper securing mechanism **18** includes a clamping member **46** in the form of an L-shaped angle iron having a generally horizontal leg **48** and a substantially vertical leg **50** extending upwardly from the front of leg **48**. Clamping member **46** is vertically moveable between locked and unlocked positions with horizontal leg **48** securing a backup member **52** in the form of a board to upper surface **38** of frame **16** in the locked position. Clamping member **46** is elongated in the longitudinal direction. Securing mechanism **18** further includes a camming member **54** which is also elongated in the longitudinal direction and is disposed within the generally L-shaped channel formed by the L-shaped clamping member **46**. Camming member **54** is rotatably mounted on a pair of mounting blocks **56** on either end of camming member **54**. A handle **58** extends transversely from camming member **54**. A pair of threaded members **60** extend respectively through a hole (not shown) formed in each mounting block **56** and a hole (not shown) in horizontal leg **48** of clamping member **46** and threadably engages a threaded hole (not shown) in upper wall **36** of frame **16**. A handle or knob **62** is connected to an upper end of each threaded member **60** to facilitate rotation of threaded member **60**. Each threaded member **60** also extends through a coil spring **64** disposed between upper surface **38** of frame **16** and horizontal leg **48** of clamping member **46** to bias clamping member **46** toward the unlocked position. Knobs **62** are rotated to rotate threaded members **60** to roughly or coarsely adjust the height of clamping member **46** and handle **58** facilitates rotation of camming member **54** which allows the quick clamping and release of backup member **52**. More particularly, handle **58** and camming member **54** are rotated as indicated by Arrow B whereby a cam surface (not shown) on camming member **54** respectively engages or disengages horizontal leg **48** to provide a relatively fine adjustment in moving clamping member **46** between the locked and unlocked positions thereof.

[0035] Lower securing mechanism **20** utilizes the same type of structure and functions in the same manner as upper securing mechanism **18** in order to secure workpiece **12** to front surface **42** of frame **16**. Securing mechanism **20** includes a clamping member **66** in the form of an L-shaped angle iron having a horizontal leg **68** and a vertical leg **70** extending downwardly from a rear end of horizontal leg **68**. Securing mechanism **20** further includes camming member **72** having a cam surface **73** (**FIG. 8A**). Camming member **72** is rotatably mounted on mounting blocks **74** with a handle **76** extending transversely from camming member **72**. Leg **68** extends forward beyond camming member **72** (**FIG. 8A**) to completely cover member **72** as viewed from above. A pair of threaded members **78** similarly extend through respective holes (not shown) in mounting block **74** and vertical leg **70** of clamping member **66** and into a threaded hole (not shown) in front wall **40** of frame **16**. Respective knobs **80** are connected to threaded members **78** and coil springs **82** are disposed between vertical leg **70** and front surface **42** to spring bias clamping member **66** in an unlocked position. As noted previously, lower securing

mechanism **20** functions similarly to upper securing mechanism **46** except that clamping member **56** moves in a forward direction in the unlocked position and in a rearward direction to a locked position to secure workpiece **12** to frame **16**. Knobs **80** and threaded members **78** provide the coarse adjustment while rotation of handle **76** and camming member **72** as shown by Arrow C moves cam surface **73** (**FIG. 8A**) to create a similar camming engagement **83** in order to provide a finer adjustment and quick locking and release of workpiece **12**.

[**0036**] An important distinction between securing mechanism **20** and **46**, and in accordance with a feature of the invention, clamping member **68** is configured to serve as a cover to prevent shavings from the cutting of workpiece **12** or other workpieces from interfering with the camming engagement (**FIG. 8A**) between camming member **72** and vertical leg **70** of clamping member **66**.

[**0037**] With continued reference to **FIG. 1**, finger-mounting assembly **22** is removably mounted on frame **16** in order to allow repositioning of assembly **22** as will be further detailed below. Assembly **22** includes a pair of spaced substantially L-shaped mounting members **84**, one of which is mounted adjacent end **28** and the other of which is mounted adjacent end **30** of frame **16**. Each mounting member **84** includes a substantially vertical lower leg **86** and a substantially horizontal upper leg **88** extending from an upper end of lower leg **86**. Lower leg **86** defines an elongated vertically extending slot **90** having an open end **92** (**FIG. 10**). Each upper leg **88** defines a pair of longitudinally extending holes **94** for receiving a pair of guide members in the form of guide bars **96**, in particular a front guide bar **96**A and a rear guide bar **96**B. Guide bars **96**A and **96**B extend parallel to one another in the longitudinal direction and are at substantially the same height. Guide bars **96**A and **96**B are each removably mounted within holes **94** of each mounting member **84**. Rear guide bar **96**B is secured to mounting member **84** by a threaded member **98** and front guide bar **96**A is similarly secured by a threaded member (not shown).

[**0038**] A pair of mounting mechanisms **100** (**FIG. 1**) are connected to front wall **40** of frame **16** via T-slot **44** in a manner well known in the art. More particularly, each mounting mechanism **100** includes a threaded member **102** with a knob or handle **103** connected thereto adjacent a forward end thereof. Each mounting mechanism **100** further includes a spacer **104** in the form of a cylindrical collar which receives threaded member **102** and is slidable with respect thereto. Each threaded member **102** is received within one of slots **90** of mounting member **84** when finger-mounting assembly **22** is mounted on frame **16** via mounting mechanism **100**.

[**0039**] A plurality of guide fingers **106** are mounted on guide bars **96**A and **96**B of assembly **22** so that they are selectively slidably movable along guide bars **96**A and **96**B. Guide fingers **106** are indicated more particularly as guide fingers **106**A-**106**I in **FIG. 1** for more detailed reference as discussed further below. Each guide finger **106** defines a pair of longitudinally extending holes **108** which respectively receive guide bars **96**A and **96**B. Each guide finger **106** is selectively secured to guide bar **96**B via threaded member **110** which extends through a hole (not shown) of each guide finger **106** whereby threaded member is selectively engageable with guide bar **96**B.

[**0040**] With reference to **FIGS. 1 and 2**B, guide fingers **106** are described in further detail. Each guide finger **106** has a first end **112**, a second end **114** opposed thereto, a first side **116** and a second side **118** opposed thereto, an upper surface **120** and a lower surface **122**. It is noted, however, that surface **122** of the finger **106** shown at the right in **FIG. 2B** is the upper surface when mounted on jig **10** as said finger is inverted with respect to the finger **106** shown on the left. Each finger is elongated between first end **112** and second end **114** and has a width W2 (**FIG. 2B**) extending from side **116** to side **118**. Holes **108** extend from first side **116** to second side **118** and are adjacent second end **114**. Each guide finger **106** when mounted on assembly **22** is connected to guide bars **96**A and **96**B at a connection site **124** (**FIG. 1**) and cantilevered forward therefrom. Fingers **106** are additionally supported by backup member **52**. Each finger includes a narrowed projection portion **126** which extends from adjacent forward hole **108** to first end **112**. Projection portion **126** includes a straight guide surface **128** and a tapered guide surface **130** on first side **116** of finger **106**. Tapered guide surface **130** extends from first end **112** toward second end **114** and intersects straight guide surface **128** a tan intersection **132** and straight surface **128** extends from said intersection **132** towards second end **114**. When mounted on frame **16** via assembly **22**, each guide finger **106** extends in the axial direction of frame **16** with projection portion **126** extending forward of guide bars **96**A and **96**B so that some part of projecting portion **126** overhangs or extends forward of front surface **42** of front wall **40**. When so mounted, straight surface **128** extends in the axial direction of frame **16** perpendicular to guide bars **96**A and **96**B and also to flat front surface **42** of front wall **40**.

[**0041**] A first slot **134** is formed in projecting portion **126** of each guide finger **106** and extends from first end **112** toward second end **114**. Each first slot **134** is substantially parallel to and centrally located between upper surface **120** and lower surface **122**. Each slot **134** extends inwardly from second side **118** of finger **106** to an axially elongated spacing surface **135** (**FIG. 14**) which is parallel to first side **116** and second side **118** of finger **106**. Thus, when fingers **106** are mounted on frame **16**, slots **134** extend in the axial direction and are substantially horizontal. A second slot **136** having a dovetail shape as viewed from above is formed in each guide finger **106** adjacent second end **114** and extends inwardly from first side **116** of finger **106** and downwardly from upper surface **120** to lower surface **122**. Rearward hole **108** intersects second slot **136** and a portion of the front hole **108** intersects second slot **136**. Guide fingers **106** are bilaterally symmetrical with respect to a plane parallel to upper and lower surfaces **120** and **122** and therefore may be used in a first position as indicated by the finger **106** in the left of **FIG. 2B** or in an inverted position as indicated by the finger **106** in the right of **FIG. 2B**. As can be seen from **FIGS. 1 and 2**B, fingers **106** are generally used in pairs in order to make the cuts in various workpieces as will be discussed further below. Fingers **106** may be paired as indicated in **FIG. 2B** with guide surfaces **128** and **130** facing one another. Alternately, they may be thought of as being paired with respective second sides **118** facing one another.

[**0042**] In accordance with a feature of the invention and with reference to **FIGS. 1 and 2**A, jig **10** further includes a specially configured spacer **138** which is insertable in a pair of adjacent second slots of a respective pair of adjacent fingers **106** in order to set the spacing between said pair of

fingers **106**. In particular, spacer **138** is a flat plate-like structure having a pair of opposed edges **140** defining therebetween a width W1 (**FIG. 2A**). Adjacent each edge **140**, spacer **138** includes a dovetail-shaped structure **142** which serves as an interlocking portion or a key having a mating configuration with second slot **136** of each finger **106**. Each dovetail structure **142** extends in opposed directions from a central portion **144** of spacer **138**. The width W1 of spacer **138** may vary in accordance with the desired spacing to be set between an adjacent pair of fingers **106**. Preferably jig **10** includes spacers **138** having various widths for spacing guide fingers at commonly desireable positions.

[0043] In accordance with another feature of the invention, jig **10** also includes a multi-position stop **146** (**FIG. 15**) including a first stop member **148** in the form of a cylindrical post (**FIG. 1**) and an annular second stop member **150** which is substantially cylindrical and defines a cylindrical hole **152** for receiving first stop member **148** whereby second stop member **150** is slidably mountable and removable from first stop member **148**. First stop member **148** has a positioning edge **149** which lies on a cylindrical outer surface thereof and which is disposed at a first location. Second stop member **150** has a positioning edge **151** (**FIG. 15**) which lies on a cylindrical outer surface thereof and which is disposed at a second location. The cylindrical outer surface of first and second stop members **148** and **150** are concentric. First stop member **148** is mounted via a threaded member **154** to front wall **140** of frame **16** via T-slot **44**.

[0044] As previously noted, jig **10** is used in the cutting of first workpiece **12** to form dovetails **14** and a second workpiece **156** to form pins **158**A-E which mate with respective dovetails **14** of first workpiece **12** to form a dovetail joint (**FIGS. 3-4**). More particularly, with regard to pins **158**, pins **158**A and **158**E are actually half pins. Pins and half pins **158**A-**158**E define respectively therebetween sockets **160**A-**160**D (**FIG. 4**). First workpiece **12** defines sockets **162**A-**162**E with **162**A and **162**E more particularly being half sockets. Workpiece **12** has a frame side **164**, a clamping side **166** opposed thereto and a stop edge **168** extending therebetween. Likewise, workpiece **156** has a frame side **170**, a clamp side **172** opposed thereto and a stop edge **174** extending therebetween. Of course workpieces **12** and **156** can be arranged in various orientations when used with jig **10**, but these references will simplify later explanation.

[0045] The operation of jig **10** is now described with reference to **FIGS. 5-18**. With reference to **FIG. 5**, first workpiece **12** is moved upwardly as indicated by Arrow B to position workpiece **12** between front surface **42** and vertical leg **70** of clamping member **66** with frame side **164** adjacent front surface **42** and clamp side **166** adjacent vertical leg **70**. Lower securing mechanism **20** remains in the unlocked position. Prior or subsequent to securing workpiece **12** in position, upper securing mechanism **18** is adjusted to the locked position to secure backup member **52** with clamping member **46** against upper surface **38** of frame **16**. With reference to **FIGS. 5-7**, spacer **138** is lowered in a substantially horizontal orientation into position in a downward insertion direction as indicated by Arrow C in **FIG. 6** so that dovetail structures **142** slide into position within respective second slots **136** of a pair of adjacent guide fingers **106**D and **106**E. Due to the mating interlocking configuration of second slots **136** and respective dovetail structure **142**, an interlocking fit between spacer **138** and each finger **106**D and **106**E automatically locks guide fingers **106**D and **106**E in fixed relation with respect to one another and sets a given spacing between this pair of adjacent guide fingers. In particular, spacer **138** sets the spacing between the respective straight surfaces **128** of guide fingers **106**D and **106**E as well as the spacing between respective tapered surfaces **130** of guide fingers **106**D and **106**E.

[0046] With continued reference to **FIG. 5**, the spacing between the other guide fingers **106** is set as desired, with or without a spacer like spacer **138**, to ultimately provide desired sizes of dovetails on workpiece **12** once cut by an appropriate cutter blade. The longitudinal positioning of guide fingers **106** is set with respect to positioning edge **149** of first stop member **148**. Although the spacing between the various guide fingers **106** may vary as desired, the figures indicate that fingers **106**A-D are in contact with one another in sequence. As already noted, fingers **106**D and **106**E are spaced by spacer **138**. Guide fingers **106**E and **106**F are spaced from one another with no spacers setting the space therebetween and guide fingers **106**E-I are respectively in contact with one another. It is also noted that guide fingers **106** are alternately in the first position and the inverted position so as to form pairs as previously discussed. Mounting assembly **22** is mounted in a first position with lower vertical legs **86** of respective mounting members **84** positioned forward of respective spacers **104** with threaded members **102** tightened with handle **104** to secure assembly **22** in the first position. As a result, guide fingers **106** are in a first axially oriented position with straight guide surfaces **128** extending forward of front surface **42** of front wall **40**.

[0047] More particularly and with reference to **FIG. 8**, once workpiece **12** is properly positioned, straight guide surfaces **128** are disposed directly above workpiece **12** with tapered guide surfaces **130** extending forward of clamp side **166** of workpiece **12**. As seen in **FIG. 8**, workpiece **12** is positioned at a first workpiece location with stop edge **168** against positioning edge **149** of first stop member **148** so that the overall spacing of guide fingers **106** is properly set with respect to workpiece **12**. Lower securing mechanism **20** is operated to move to the locked position so that workpiece **12** is secured by clamping member **66** against front surface **42** of front wall **40**. More particularly and with reference to **FIG. 8A**, handle **76** is rotated as indicated by Arrow C so that camming member **72** moves clamping member **70** into the locked position via the camming engagement **83** between the two members **70** and **72**, which is, as previously noted protected from shavings by member **70** serving as a cover. Workpiece **12** is now ready to be cut by a cutting mechanism to form dovetails **14**.

[0048] As indicated in **FIG. 9** by dashed line **168**A, positioning edge **149** of first stop member **148** aligns stop edge **168** with the portion of first side **116** of guide finger **106**A which is disposed furthest to the left. **FIG. 9** shows in fragmentary a router **176** having a guide sleeve **178** with a tapered cutter bit **180** extending therefrom. Router **176** further includes a base **182** which is seated atop guide fingers **106**. Cutter bit **180** has already cut half socket **162**E and socket **162**D and is in the process of cutting socket **162**C. In particular, guide sleeve **178** follows respective straight guide surfaces **128** of fingers **106** in order to cut said sockets **162**. More particularly, half socket **162**E was cut by

guiding sleeve **178** along straight guide surface **128** of guide finger **106**A, socket **162**D was cut by guiding guide sleeve **178** along straight surfaces **128** of guide fingers **106**B and **106**C and so forth. Thus, once the cutting of workpiece **12** is complete, the straight guide surfaces **128** of guide fingers **106**D and **106**E will have been used for the cutting of socket **162**C, straight guide surfaces **128** of guide fingers **106**F and **106**G will have been used to cut socket **162**D and straight guide surface **128** of finger **106**H will have been used to cut half socket **162**E. Thus, guide finger **106**I is not used in the cutting of any sockets **162** for workpiece **12**. As detailed below, guide finger **106**I is however used in the cutting of second workpiece **156**.

[**0049**] Once tapered cutter bit **180** has cut all of sockets **162** in workpiece **12** to form dovetails **14**, handle **76** of lower securing mechanism **20** is rotated to the unlocked position and knobs **80** are unscrewed to allow workpiece **12** to be removed as indicated by Arrow D in **FIG. 10**. **FIG. 10** also shows that cutter bit **180** made cuts into backup board **52** during the process of cutting sockets **162** in workpiece **12**. After removing workpiece **12**, knobs **103** are turned along with threaded member **102** to loosen mounting mechanism **100** so that finger-mounting assembly **22** may be removed as shown by Arrow E in **FIG. 10**.

[**0050**] **FIG. 11** shows that spacers **104** of mounting mechanism **100** are then moved forward as indicated by Arrows F to a second position so that mounting assembly **22** with fingers **106** can be moved rearwardly to a second axially oriented position by the lowering of assembly **22** as indicated by Arrow G with slot **90** of lower vertical leg **86** receiving threaded member **102** of mounting mechanism **100**. In the second position, fingers **106** are moved rearwardly in the axial direction of frame **16** so that only tapered guide surfaces **130** of fingers **106** extend forward of front surface **42** of front wall **40**. Moving assembly **22** to this second position is in preparation for the cutting of sockets **160** in second workpiece **156**.

[**0051**] **FIG. 12** shows spacer **138** being removed from the respective second slots **136** of the pair of adjacent guide fingers **106**D and **106**E as indicated by Arrow H. **FIG. 13** shows finger **106**E being moved in a longitudinal direction toward finger **106**D as indicated by Arrow J after loosening the respective threaded member **110** and subsequently horizontally oriented spacer **138** being inserted in a rearward, substantially horizontal insertion direction as indicated by Arrow K into the respective first slots **134** of a second pair of adjacent guide fingers **106**E and **106**F so as to set the spacing between fingers **106**E and **106**F. Once spacer **138** has been inserted in first slots **134**, threaded member **110** of finger **106**E is tightened to secure finger **106**E to guide bar **96**B to secure the position of guide finger **106**E. **FIG. 14** shows spacer **138** inserted in the first slots **134** of fingers **106**E and **106**F with dovetail portions **142** disposed within said slots **134** and edges **140** abutting respective spacing surfaces **135**. Neither of guide fingers **106**D or **106**F were moved in establishing the new spacing between finger **106**D and **106**E and between fingers **106**E and **106**F.

[**0052**] It is noted that while the use of only one spacer **138** has been described for simplicity, a plurality of spacers **138** may be used in the same manner to set the spacing between respective adjacent pairs of guide fingers **106**. Each spacer **138** used between a given set of guide fingers **106** may be of a different width W1 (**FIG. 2A**) if desired to create the desired size of dovetails and pins of the finished joint between workpieces **12** and **156**. Thus, for example, another spacer **138** may have been initially inserted in the respective second slots **136** between fingers **106**F and **106**G to set the spacing therebetween for the cutting of workpiece **12**. Then, as described in the previous paragraph, the additional spacer **138** would be removed, finger **106**G, which would have been spaced from finger **106**F by the additional spacer **138**, would be moved toward finger **106**F and the additional spacer **138** would be inserted in the respective first slots **134** of fingers **106**G and **106**H.

[**0053**] Once finger **106**E has been repositioned and with reference to **FIG. 15**, second stop member **150** is moved as shown by Arrow L onto first stop member **148** which is received within hole **152** of second stop member **150**. The addition of second stop member **150** creates a second workpiece location for workpiece **156** via positioning edge **151** of member **150**. Once second stop member **150** is in place, second workpiece **156** is moved as indicated by Arrow M between clamping member **66** and front surface **42** of front wall **40**.

[**0054**] **FIG. 16** shows workpiece **156** in the second workpiece location with stop edge **174** abutting positioning edge **151** of second stop member **150** and an upper end of workpiece **156** abutting guide fingers **106**. Clamp side **172** faces forward and frame side **170** faces rearwardly. Lower securing mechanism **20** has been moved into the locked position via the adjustment of knobs **80** and the rotation of handle **76** to secure workpiece **156** against front surface **42** so that workpiece **156** is ready to be cut.

[**0055**] As seen in **FIG. 17**, the addition of second stop member **150** creates the second workpiece location for second workpiece **156** a longitudinal distance D1 from the first workpiece location (**FIG. 8**) established by positioning edge **149** of first stop member **148**. Distance D1 is equal to width W1 (**FIG. 2B**) of a guide finger **106**, which is equal to the thickness of annular second stop member **150** from the inner surface bounding hole **152** thereof to positioning edge **151**.

[**0056**] The repositioning of the workpiece location by the use of positioning edge **151** of stop member **150** ultimately positions workpiece **156** in the longitudinal direction with respect to fingers **106** so that sockets **160** will be cut in the proper place to allow proper alignment of the dovetails **14** and pins **158** to form the dovetail joint (**FIG. 3**). As shown in **FIG. 17**, router **176** is again positioned with base **182** atop fingers **106** although this time a straight cutter bit **182** is used in order to cut sockets **160** in the formation of pins **158**. As seen in **FIG. 17**, the cutting of sockets **160** does not include the use of guide finger **106**A. **FIG. 17** shows socket **160**A having been cut by cutter bit **182** as guide sleeve **178** moved along tapered guide surfaces **130** of guide fingers **106**B and **106**C. **FIG. 17** also shows cutter bit **182** in the process of cutting socket **160**B with guide sleeve **178** having been guided along tapered surfaces **130** of guide fingers **106**D and **106**E. Once completed, socket **160**C will have been cut using tapered surfaces **130** of guide fingers **106**F and **106**G and socket **160**D will have been cut by cutter bit **182** using tapered surfaces **130** of guide fingers **106**H and **106**I.

[**0057**] As seen in **FIG. 18**, said sockets **160**A-**106**D have been cut in workpiece **156** to form pins **158**A-**158**E. At this

stage, all the cutting to form the dovetail joint is completed. Thus, lower securing mechanism **20** is operated via knobs **80** and handle **76** to move to the unlocked position and workpiece **156** is removed as indicated by Arrow N. Thus, jig **10** provides several unique, simple and cost-effective features which overcome the problems discussed in the Background of the present application.

[0058] It is noted that the method of using jig **10** has been described regarding first workpiece **12** to form dovetails **14** and then cutting second workpiece **156** to form pins **158**. As previously noted, the cutting of the first workpiece to form the dovetails was achieved by guiding the cutter along the straight parallel edges of the guide fingers while the cutting of the second workpiece to form the dovetails was achieved by guiding the cutter along the tapered edges of the guide fingers. In conjunction with this order of the process, the second stop member **150** was positioned over the first stop member **148** to move the workpiece location away from the first stop member **148** or generally in the right as viewed in the drawings. Thus, the second workpiece is positioned in a first longitudinal direction with respect to the first workpiece location while the spacer **138** is also moved in this first direction during the process of changing the location of the guide fingers to change from the first workpiece cutting configuration to the second workpiece cutting configuration. During this switch-over process, the guide finger which is moved in conjunction with the movement of spacer **138** from the second slots to the first slots moves in a longitudinal direction opposite that of the movement of spacer **138** and the workpiece location. The multi-position stop **146** is thus used to create a second positioning surface which is longitudinally in the first direction with respect to the first workpiece positioning surface. As shown in **FIGS. 10 and 11**, finger-mounting assembly **22** is moved axially in order to change the guide surfaces being utilized, in particular, moving guide fingers **106** from a position where the straight surfaces are used in the cutting of the first workpiece and the tapered surfaces are used in the cutting of the second workpiece. As will be evident to one skilled in the art, it is further noted that this process could be generally reversed whereby the second workpiece is cut first using the tapered surfaces in order to cut the pins and the first workpiece is cut second using the straight surfaces to cut the dovetails. This reversal of the procedure would thus change the direction of movement with regard to the various items discussed above in this paragraph, such as the location of the workpieces, the movement of the spacer and movement of the finger when switching between the first workpiece cutting configuration and the second workpiece cutting configuration.

[0059] As will be appreciated by those skilled in the art, a variety of changes may be made to jig **10** which are within the scope of the invention. For instance, stop **146** (**FIG. 15**) can take a number of configurations which set first and second workpiece locations with first and second stop members. First and second stop members need not have cylindrical outer surfaces and may simply be a pair of stop members which are selectively positionable adjacent one another on the frame. Most preferably, the second stop member is in contact with the first stop member when positioned adjacent thereto and more preferably defines an opening for receiving some portion of the first stop member. While second stop member **150** includes a through hole **152** allowing it to be mounted on the first stop member with either side of second stop member **150** facing the frame of the jig is not necessary for the hole to extend all the way through second stop member. However, the annular or doughnut-shape of second stop member **150** simplifies the mechanism so that no particular measurement or alignment is required in order to change jig **10** from the first position for a first workpiece to the second position for a second workpiece. Second stop member **150** simply slides onto first stop member **148** and regardless of the orientation of stop member **150** always provides positioning edge **151** in the same location.

[0060] In addition, different configurations of guide fingers and corresponding spacers may be provided while still providing the central functions described herein. It is noted that the slots formed in fingers **106** may have different configurations. With respect to second slots **136**, different shaped slots may be formed with a mating configuration of spacer **138** whereby a spacer analogous to spacer **138** interlocks with a pair of adjacent guide fingers to fix the relationship between the two and thereby set the spacing therebetween. In addition, first slots **134** may be configured differently as well. For instance, analogous first slots could be defined in fingers **106** whereby a spacer analogous to spacer **138** may be received downwardly as is the case with the use of spacer **138** in second slots **136** instead of entering slots from a forward position by moving in a substantially horizontal direction. Further, dovetail slots or similar interlocking configurations may be formed as an alternate to first slots **134** to automatically fix an adjacent pair of guide fingers as demonstrated via second slots **136**. While first slots **134** may be replaced with slots which are adjacent second end **114** of fingers **106**, it is preferred to have a spacer disposed closer to tapered guide surfaces **130** in order to provide more substantial support between the pair of fingers which are spaced by the spacer.

[0061] This is particularly true with the type of fingers described herein because the projection portions **126** are longer than the projection portions of guide fingers which extend respectively in opposite directions from a connection site with guide surfaces on both sides of the connection site. Obviously, projection portions **126** are relatively longer than such other fingers due to the combination of having straight guide surfaces and tapered guide surfaces on a single projection portion extending generally in one direction. While of course fingers **106** may be wider or thicker in various dimensions in order to provide a stronger projection portion so that the positioning of a spacer between the projection portions is less critical, this would of course increase the amount of material required to produce guide fingers such as guide fingers **106** and may inhibit the ability to form smaller sized dovetails, pins or other joint members. Due to the extra length of projection portions **126**, it is noted that it is preferable for the guide fingers which are not spaced by spacers such as spacers **138** to be in abutment with one another to provide additional strength to the projection portions, especially the tapered guide surfaces **130** which extend furthest from the connection site.

[0062] In addition, guide fingers and corresponding spacers may be formed without the use of slots in the guide fingers. For instance, guide fingers could alternately be formed with holes or openings therein into which a portion of a spacer could extend to fix the longitudinal relationship between a pair of adjacent guide fingers. One example of this type of configuration would be guide fingers having

non-cylindrical holes extending downwardly therein with a spacer having a pair of extensions with a mating cross-sectional configuration with the respective holes whereby the extensions fit into the holes in an analogous way to the dovetail structures fitting into the slots of the embodiment shown in the figures of the present invention. Alternately, guide fingers could be formed with posts or other projections extending outwardly therefrom to fit into holes or slots formed in a spacer. Other analogous configurations will be evident to one skilled in the art. A variety of other changes would be apparent to those skilled in the art and are within the scope of the present invention.

[0063] In the foregoing description, certain terms have been used for brevity, clearness, and understanding. No unnecessary limitations are to be implied therefrom beyond the requirement of the prior art because such terms are used for descriptive purposes and are intended to be broadly construed.

[0064] Moreover, the description and illustration of the invention is an example and the invention is not limited to the exact details shown or described.

1. A jig used for cutting joint members in workpieces, comprising:

a frame having axial and longitudinal directions and adapted to selectively secure the workpieces to be cut;

a plurality of guide fingers elongated in the axial direction; each guide finger having guide surfaces adapted to guide a cutter in the formation of the joint members; the guide fingers being selectively positionable in the longitudinal direction; and

a spacer selectively mountable on a first pair of adjacent fingers to selectively fix the adjacent fingers in the longitudinal direction with respect to one another, thereby setting longitudinal spacing between the first and second fingers.

2. The jig of claim 1 wherein the spacer forms an interlocking engagement with each of the first pair of adjacent guide fingers when mounted thereon.

3. The jig of claim 2 wherein each of the first pair of adjacent fingers defines a first slot in which a portion of the spacer is selectively receivable to form each respective interlocking engagement.

4. The jig of claim 3 wherein the first pair of fingers each have an upper surface; and wherein the first slots extend downwardly from the respective upper surfaces whereby the spacer is inserted into the respective first slots in a downward insertion direction.

5. The jig of claim 3 wherein each guide finger has a second slot formed therein whereby the respective second slots of a second pair of adjacent guide fingers are aligned with one another to receive a spacer therein to set longitudinal spacing between the second pair of adjacent guide fingers.

6. The jig of claim 5 wherein each guide finger is mounted on the frame at a connection site; wherein each guide finger has a projection portion which is cantilevered from the connection site and which has straight and tapered guide surfaces thereon respectively adapted to guide the cutter in the respective formation of dovetails and pins; and wherein each second slot is formed in the projection portion.

7. The jig of claim 6 wherein first and second guide fingers form the first pair of adjacent guide fingers; wherein the second guide finger and a third guide finger form the second pair of adjacent guide fingers; and wherein the spacing set between the first pair of adjacent guide fingers is associated with use of the straight guide surfaces; and wherein spacing alternately set between the second pair of guide fingers is associated with use of the tapered guide surfaces.

8. The jig of claim 7 wherein the spacer which is receivable in the respective first slots of the first and second fingers is alternately receivable in the respective second slots of the second and third fingers.

9. The jig of claim 8 wherein alternately receiving the spacer in the respective second slots of the second and third fingers to set the spacing therebetween is achievable by repositioning the second guide finger without repositioning the first and third guide fingers.

10. The jig of claim 3 wherein each finger is mounted on the frame at a connection site; and wherein the first slot is situated above the connection site.

11. The jig of claim 1 further including a stop comprising a first stop member having a first positioning surface positionable at a first location and adapted for positioning one of the first and second workpieces and a second stop member having a second positioning surface positionable at a second location and adapted for positioning the other of the first and second workpieces.

12. The jig of claim 11 wherein the second stop member defines a hole in which the first stop member is selectively receivable to mount the second stop member on the first stop member.

13. The jig of claim 1 wherein a workpiece-securing mechanism is mounted on the frame and includes an elongated clamping member adapted for clamping a workpiece to the frame and an elongated camming member having a cam surface engageable with the clamping member for selectively moving the clamping member in a tightening direction; wherein the clamping member serves as a cover adapted to prevent workpiece shavings from interfering with the engagement between the cam surface and the clamping member; and wherein the clamping member includes a rear clamping portion with a workpiece-engaging surface facing the frame and a top portion connected to and extending from the rear clamping portion away from the frame and over the camming member.

14. The jig of claim 13 wherein the clamping member in cross section is L-shaped.

15. A method comprising the steps of:

securing a first workpiece to a frame having axial and longitudinal directions;

positioning a plurality of axially-elongated guide fingers in the longitudinal direction;

fixing a first adjacent pair of the guide fingers in the longitudinal direction with respect to one another with a spacer, the first adjacent pair including first and second guide fingers;

securing the plurality of guide fingers with respect to the frame; and

guiding a cutter with the guide fingers to cut the first workpiece.

16. The method of claim 15 wherein the step of fixing includes the step of inserting the spacer into a pair of first slots formed respectively in the first and second guide fingers.

17. The method of claim 16 wherein the step of inserting includes the step of interlocking the spacer with each of the first and second guide fingers.

18. The method of claim 15 further including the steps of removing the first workpiece from the frame; securing a second workpiece to the frame; removing the spacer from the first slots; repositioning the second guide finger in the longitudinal direction; inserting the spacer into a pair of second slots one of which is formed in the second guide finger and the other of which is formed in a third guide finger disposed adjacent the second guide finger opposite the first guide finger in the longitudinal direction; and guiding the cutter with the guide fingers to cut the second workpiece.

19. The method of claim 18 further including the steps of placing the first workpiece against a first stop member to position the first workpiece at a first workpiece location; and placing the second workpiece against a second stop member to position the second workpiece at a second workpiece location which is longitudinally spaced from the first workpiece location.

20. The method of claim 19 further including the step of mounting the second stop member on the first stop member prior to the step of placing the second workpiece against the second stop member.

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